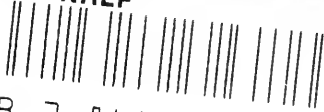


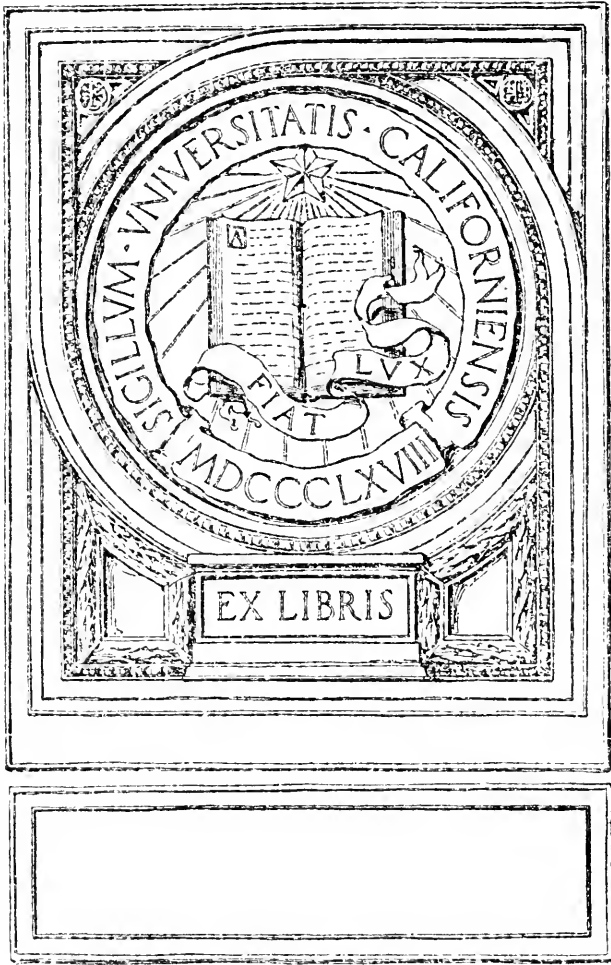
FOOD AND FITNESS

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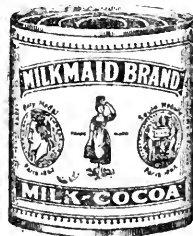
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FOOD AND FITNESS

OR

DIET IN RELATION TO HEALTH

BY

JAMES LONG

AUTHOR OF "THE COMING ENGLISHMAN," "MAKING THE MOST OF
THE LAND," "BRITISH DAIRY FARMING"

LATE MEMBER OF THE EXECUTIVE COMMITTEE OF THE CENTRAL CHAMBER OF
AGRICULTURE; MEMBER OF THE SMALL HOLDINGS' COMMITTEE AND FORMERLY
PROFESSOR IN THE ROYAL AGRICULTURAL COLLEGE;
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PREFACE

MODERN investigation, both in science and practice, has demonstrated the fact so clearly that it cannot be mistaken, that health is very largely governed by the food we consume. That we eat too much is admitted by intelligent students of dietetics. That we eat carelessly, quickly, irregularly, and too often, and without regard to the essential importance of mastication and perfect digestion, is also admitted. When, however, we discuss with the average man the question of what we should eat and what we should avoid, we tread upon difficult ground. Preference and prejudice then come to the front, and thus, without understanding the principles of nutrition, and the reasons why some forms of food are so much better than others, argument loses its force in the presence of the belief inculcated by the example of parents and of general practice.

I am not a vegetarian, although I am conscious that flesh food is not essential to health or to strength, and that as we reach middle age it is a danger to both. There are many exceptions, but evidence proves that an enormous majority of meat-eaters, and especially of those who eat meat

—fish, flesh, or fowl, two or three times a day—acquire some form of disease which is practically foreign to the vegetarian or the temperate man.

To a large extent health is a matter of education. I have been engaged for a long series of years in a study of the feeding of the live-stock of the farm, both on its scientific and practical sides, and I find that the knowledge displayed by owners of horses, cattle, sheep, swine, and poultry is much more profound than that which applies to themselves. In relation to stock the object of the feeder is to provide what will ensure health and a profitable return. He supplies not what an animal would choose if it could, but what he thinks is the best for his purpose. With regard to himself it is quite the reverse. He consumes not what is the best food for his system, but what pleases his palate, eating as often and as much as he likes. Argument is futile, demonstration is hopeless, for most people insist that all things are good for their stomachs, or that one man's meat is another man's poison.

The number of deaths, between 60 and 70, of men who should live many years longer, from diseases attributable to excessive eating, or to eating improper foods, is probably greater than that which is due to the consumption of alcohol.

I have attempted, in the following pages, to

show why these appalling losses occur, how to avoid the diseases which cause them and the dangers which they are constantly threatening.

This is neither a purely scientific nor theoretical discussion of food in relation to health, but the result of a wide study of the scientific side of the subject, which I have applied in actual practice. Long-continued ill-health,—caused by consumption of inappropriate food,—which the most drastic medical treatment failed to restore to normal condition, induced me to apply the principles of nutrition—as I had studied them in relation to the domestic animal world—to myself. The result was immediate, and I never looked back from the moment of exchanging the usual diet with meat for one in which fruit plays the principal *rôle*. Robust health—which I was advised by the ablest of men could never return at a late period of life—strength, mental activity, and sleep, an almost unknown quantity, made life worth living once more. Yet a free hand is maintained, so that in case of necessity I can eat like the rest of the world. What has happened to me has happened to thousands, and will happen to many who have the desire, and are willing to test a system which cannot do harm, but will certainly be of assistance to those who honestly make the attempt. While I cannot undertake to answer the inquiries of the curious, my desire is

to be useful to those to whom, for similar reasons to mine, the joy of living is a thing of the past.

Life does not consist of eating and drinking with the result that to-morrow we die. God has a purpose with us all, and I believe that purpose is frequently marred by ourselves and our irrational habit of living. There is no form of vegetable food—bread, pulse, cereals, garden vegetables, or fruits—placed upon our tables which contain, or produce, poisonous substances. On the contrary, there is no flesh food, alcoholic liquor, coffee, or tea which do not. It is the act, perpetrated two or three times a day, which becomes the confirmed habit, of taking something which is deleterious, that tells in the end, and that is constantly robbing the world of lives before they have contributed their share for the general good in their day and generation.

I tender my grateful thanks to Prof. Chittenden of Yale, Dr. Bircher Benner of Zurich, and Dr. Hindhede of Copenhagen, all of whom may have the satisfaction of knowing that they have been the means of mending many broken lives by their teaching and example. I shall be amply repaid if I can be used in restoring one bruised being to that happy condition which is meant for us all.

The prices of foodstuffs are based chiefly upon pre-war quotations.

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FOOD AND FITNESS

CHAPTER I

THE ART OF LIFE

DURING a comparatively few weeks, immediately preceding the commencement of this chapter, the author lost five old friends, varying in age from sixty to sixty-six—all of whom, blessed with good constitutions, ought by all the laws of life to have lived another twenty years. In one instance health was subordinated to science, in another to pleasure, and in the third and fourth to carelessness, born of ignorance of themselves. In each case a vital organ broke down owing to that absolute failure to recognise the laws which govern health, and to the consequent pressure which is placed upon the mechanism of the body—a pressure which a much less delicate organism could not successfully withstand.

Man has constructed beautiful machinery, and whether it is working or not, he maintains it in

perfect order. He lubricates it, he adjusts it, he repairs it, and when it is working he "stands by," careful not to work it too fast, and to maintain regular action and perfect equilibrium. The same man neglects the mechanism of his own body, which is a thousand times more fragile and wonderful than any machine in the world; he fails to keep it clean, and never adjusts it for twenty-four consecutive hours. On the contrary, he abuses it with more or less regularity until the end of his life, denying to himself that care, thought and attention which he confers on the machinery in his factories, and the horses and cattle which he controls.

I have met with persons who indulge in all the good things of life, and who, with the arrival of physical trouble, throw the onus on God. The unwritten laws of the universe which teach us that we shall reap what we have sown, are ignored altogether in the claim to eat and to drink, not only what God has provided, but what man has invented to give pleasure to the palate or a stimulant to the system, as often and as abundantly as he chooses.

If alcohol kills its thousands, excessive eating and the consumption of improper foods kill their thousands too. The systems of man and the animals he domesticates are closely allied. Why,

therefore, should he indulge himself as he dare not indulge them, without the conviction that he will pay for it, as they would, by the destruction of his health or the loss of his life? Science has determined with some accuracy not only what foods but what quantities of those foods domestic animals require, both under conditions of labour and inactivity, for the maintenance of their health and productive power. Man ignores all teaching in the same direction, and, having eaten enough for two or three people, or eaten unsuitable foods and been attacked by some disease in consequence, he prays for recovery from the trouble which he says God has "inflicted" upon him. The disease is not the work of a merciful Creator, it is *self*-inflicted; it is the harvest which follows the sowing of the seed.

The man who drives to his office after a bountiful breakfast, works until one, and then indulges in a costly and liberal luncheon, cannot continue the practice without harm. Still less can he drive home again, eat a four or five course dinner with wine, and remain well, in spite of his doctor. He may abuse himself in this way when he is young and vigorous, but he is only deferring the day of collapse, which nothing can avert if he persists. So it is that strong men live "well" for a time, and later on simply exist with the assistance of their medical man, until an organ breaks down

when they reach sixty to sixty-five years of age—and they are gone. Thus a life is wasted although it might have been long, useful and happy. This is no less than unintentional suicide. God is not the dread being who condemns one of His creatures to die immature, and another to die at the age of fourscore. Inheritance, environment, occupation, the example and teaching of parents, all play a part in man's physical power, his health, his happiness, and the length of his life. Knowing, as we do, that the clergyman and the farmer live much longer than the butcher or the miner, that the temperate man lives longer than the intemperate, the children of long-lived parents than those whose parents were unhealthy and died young, how can we regard "chance" as a factor in the length of our days, or presume to believe that God selects victims for early destruction or for the infliction of a lingering or painful disease? Or, on the other hand, how can we suppose that health and length of life are not largely in our own hands?

Life, and especially happy life, depends much upon its usefulness. If it is aimless, if it is unoccupied, it breeds discontent, alike with its fellow-man and its Maker. Life should be employed with a purpose, an object which is outside of itself. If it is buoyant and bright, that object

will be attained, in so far as its powers permit; but if it is governed by a temperament which is always devoted to self and self's sorrows, whether they are real or imaginary, it will decline and leave nothing behind it but the sad epitaph: "What might have been."

Those who are sinking in the "vale of years" will not find the physical life respond to mere physical help. There is a psychical side. While recognising all the blessings we enjoy, we should follow some pursuit right up to the last, engaging the mind by which the body should be controlled. It has been said that while the healthy body of a strong man obeys the mind, the unhealthy body of a weak man rules it. In the practice of the art of life man should not be controlled by circumstances—he should control them. If he knew that, like a clever woman, he could preserve himself, *as she can preserve her beauty*, by self-control, he would still fail, as woman fails, because she declines to believe. There is no more certain road to this result than to reject those foods which, like alcohol, make the body coarse and impinge upon the mind. The beauty of woman, like the mind of man, is marred by flesh-food eating, as by strong drinking, and retained by taking fruit instead.

Science has made great efforts to exterminate

contagious diseases, and to cure or alleviate those which are organic in character—and with enormous success; but she has made practically no effort at all to prevent those physical troubles which are caused by our habits or by our ignorance of ourselves. The general public know nothing whatever about the functions of their bodies, or, indeed, of the functions of their food. To the man in the street one form of food is as good as another—better only or worse when it conflicts with his taste. The rich indulge in costly productions, while the poor affect the same style in their limited way. The fact that some foods are detrimental to the health, which they ultimately destroy in the great majority, is less understood than the fact that over-eating is a dangerous habit. If the laws of health were studied as acutely as the appetite, dress, pleasures and means of “getting on,” we should be a different people—a robust, an increasing, a happier and more prosperous race. But the time is not yet, the majority will continue to adhere to the remarkable words, “Let us eat and drink, for to-morrow we die,” and this literally represents the attitude of many practical, educated and religious men, who in some mysterious way appear to believe that “all men are mortal but themselves.”

Pure air is another condition of health and long

life. Although man cannot live for five minutes without air he may live without food for a week; he subordinates pure air to personal comfort, or ignores it altogether. Air is excluded from our bedrooms as though it were the poisonous gas which we exhale from the lungs, and which we take every care to preserve that we may inhale it again, by ignoring ventilation. Travellers by rail are frequently crowded in a third-class compartment with both windows closed, rejecting any suggestion to the effect that air is essential to life in their fear of catching cold. I have visited a patient lying in the last stage of consumption in a bedroom of some 12 ft. by 9 ft. in which there was no ventilation whatever. The window was permanently closed; there was no fireplace, and consequently no chimney; while the door was closed too. The man who is compelled to labour in an office, a factory, a shop, or a warehouse, where the air is impure, as it usually is in crowded towns, can, and *must* if he would live a normal life, pass abundance of fresh air through his lungs by taking long walks away from the streets and habitations of men, where alone he can obtain what he wants.

A man walking at a pace of four miles an hour passes five times as much air through his lungs as a man sitting, while a man sitting inhales more than a man lying or sleeping. The carbon of food,

which acts chiefly as fuel in warming the body and providing for the exercise of energy, is burnt when it comes into contact with the oxygen of the air, which passes into the lungs, as perfectly as coal is burnt in a stove. If, however, the passage of air through the stove is restricted the fire burns imperfectly, or it goes out. It is precisely the same in the human body. If the breathing is restricted, or the air is impure, something goes wrong, and the body suffers accordingly.

If a healthy man observes the laws of health he will remain healthy until he is worn out. He cannot acquire disease from pure air, a clean body, exercise, or the moderate consumption of suitable food. If, however, these laws are ignored, it is only a question of time for the human machine to break down. There is only one course to pursue in order to live wisely and long—there is no halfway house—and that way is found in the constant observation of these laws. By the adoption of this course the system is hardened and unaffected by those changes which occur in the weather, and in our everyday life, but which immediately affect the unfit.

We are shown by our official statisticians that while only one-half the ministers of religion, followed by farmers, die at the average age of all men, the publican dies at three times—and the barman four

times—their speed. While man lives longer by ten years than he did a century ago, or by twenty than he did a century before that, we are still far from reaching the age to which we should live if we took greater care. We live faster, and nerves, heart disease, tuberculosis and determination to “get on” are killing almost as many men as have been saved by improved sanitation and hygiene. We should never work against the grain—live in the country as much as we can, eat only three meals a day, and repudiate afternoon-tea—a suggestion which will not meet with the approval of women.

How far we shall advance in the improvement of the character of the race, as distinct from its physique, is another matter. Woman plays a great part here. Many of the noblest, gentlest, purest and most unselfish characters prefer to glorify the celibate life. In their anxiety to accomplish good works, and to obey the teaching of Scripture, many disobey the universal and instinctive law of life—a law in which the most beautiful of all the attributes of man is involved, “Be fruitful and multiply”—the law of Love. Thus posterity is deprived of characteristics which, inherited from some of the best of mankind, would help to lift the race to a higher and holier plane, while vice perpetuates its progeny unchecked.

Another question occurs in relation to habits, which we are told form character, as character forms destiny. Thus, a regular habit of doing the right forms a righteous character, and the character makes the man. The character of a righteous man ensures peace, contentment, satisfaction, happiness; and these attributes assist in maintaining health and long life. There are many beautiful characters in the world who ignore habit in deference to their unselfish desires. It is a deliberate act of wrong-doing to play with one's health for any object whatever. Life is given us for a purpose, and that purpose is best served by preserving it as carefully as we can, but without ever making health a fad. The longer a man or a woman lives in a condition of fitness, the longer and better the service which they can render to others.

There is a system of maltreatment by stuffing with food which is adopted with the object of restoring health to those suffering from nervous and other complaints of which the public should beware. It was remarked by Dr. Keith, in his *Plea for a Simple Life*, that among the cases of maltreatment with which he was acquainted a patient suffering from enlargement of the stomach was provided with a daily ration consisting of $1\frac{1}{2}$ lb. of pounded beef, 1 lb. of fish, two large meals

of revalenta, one of Benger's food made with meat stock, 6 to 8 glasses of milk, a portion of which was given with the revalenta, with coffee and biscuits during the night. The stomach of the patient was daily washed out with a stomach pump. This authority, in discussing this question, suggested that medical men should point out to patients the principles upon which they are treated. If this plan were adopted educated men would hesitate before permitting themselves to be treated by the drastic method of stuffing.

Those forms of disease for the cure of which patients are required to eat abnormally large quantities of food are frequently caused by the consumption of *wrong* food. Thus it happens that fuel is added to the fire—the objectionable food being eaten in still larger quantities, while the organs of digestion are simultaneously taxed beyond their powers of endurance. In similar cases the abolition of flesh foods in favour of small quantities of fruit, vegetables, cereals, butter and milk, has cleared the ground and restored the patient to health. In cases of digestive trouble, abstinence in the absence of appetite until the desire for eating returns gives nature her chance. There is less waste of food in the process of nutrition when the body is unfit, from a small ration, than when it is large. Persons in bad health, however,

are induced to eat abundantly to please their doctors and their friends, although they are averse to the practice and have no desire for food.

Some persons maintain excellent health by abstaining from food at the first meal of the day, content only with a cup of coffee, while others take only a coffee and roll. Dr. Rendall, the well-known English physician at Mentone, once pointed out the same fact to the writer, remarking that he was able to see all his patients before lunch on this small quantity of food, while English patients eating abnormally large breakfasts came to him for advice. The practice of "over-eating conduces to chill or deposit in some overworked organ," and possible permanent trouble, while flesh-eating is impossible for the nervous, the gouty, or those with rheumatic tendency. The consumption of large quantities of food, too, induces the blood to flow to the organs of digestion, which become enlarged, with the result that the appetite is not satisfied until they have been supplied with more than they need.

Referring to this point, Dr. Keith remarks that under such conditions alcohol, meat, tea, with other unsuitable foods being freely supplied, a crisis arrives, which the healthiest cannot prevent. If, however, nature is permitted to assert herself by abstinence from food, instead of being pre-

vented by the use of aperients, she will punish her broken laws by the cessation of the desire for food and promote the work of restoration. If this is accomplished there should be no repetition of the practice of over-eating. Most of us receive warnings with regard to our health, which we ignore until serious trouble arises. The strong man succumbs to a practice which a weak man dare not attempt to pursue. If, however, he followed the weak man's example he would live longer and happier, and transmit to the next generation that strength and endurance which the race needs; and so by the adoption of that course of procedure which man follows with his horses and cattle, each generation would grow stronger and stronger until the average life of our people might be raised to fourscore years, and that of the strongest of all to a hundred.

Among the most important and valuable practices which, in common with much older people, we have found most useful in preserving health are—

1. A good smart walk before breakfast.
2. Meals at regular hours.
3. The thorough mastication of food: never eating too much.
4. The avoidance of fish, flesh, or fowl, or their very occasional use.

5. The consumption of fruit at all meals.
6. Early rising and early to bed.
7. Windows always open in the bedroom.
8. Avoidance of rich sauces, condiments and patent foods which require no chewing.
9. Abstinence from alcohol, tea and coffee.
10. Walking at least six miles a day at a good pace.
11. A hobby—if it is work so much the better.
12. No constructive brain work after the last meal, which should never be later than 7.30 if sleep is required.
13. At least six hours' sleep for the adult.

CHAPTER II

FOOD AS A GOVERNING FACTOR IN HEALTH

THERE is a common desire among men, who have found something beneficial to their spiritual or physical health, to impart the secret to others. I am neither a vegetarian nor a fruitarian, but, while I believe that vegetable foods should form the basis and bulk of all that we eat, I would leave responsible and healthy people who have studied the functions of food to arrange their diet for themselves. As a food reformer, however, I make two reservations. The first is, that the consumption of meat should be largely reduced—it would be better abandoned by middle-aged people—and the provision of fruits largely increased.

LENGTH OF LIFE

I need scarcely remark that there are some people—although they are few—who have eaten and drunk just what they liked best, who have lived to great ages. Not one of us, however, can

presume upon a similar result by following a similar practice. The fact remains that eight persons out of nine die before they have lived a life of normal length, and that the average length of life should be thirty years longer. I am led to believe from all I have read of the habits of those who have lived very long lives, and by my observation of the results of excessive, or careless, eating and drinking on the one hand, and of moderate eating and adherence to a diet chiefly composed of fruit and vegetable on the other, that the length of life depends to a large extent upon ourselves. In other words, I believe that with care in the selection and consumption of food, with liberal exercise, and the judicious management of their bodies, healthy persons should live until eighty-five or ninety, and that the *average* expectation of life should be seventy years.

GOOD DIGESTION A MISFORTUNE

I suppose that there is no branch of knowledge about which the public know so little as that which relates to food and its functions, its influence on their health and their lives, and its nutritive value. Each man is a law unto himself. A fat man with a good digestion is perfectly satisfied: nothing troubles him but his appetite, which he gratifies to the full, unconscious of, and indifferent

to, the fact that his digestion is his misfortune, and that he is unlikely to live a long life. The large eater of meat, like the frequent consumer of alcohol, lives on a volcano, careless of the fact that he is putting unhealthy pressure upon vital organs, one of which is almost certain to break down earlier than nature intended.

MEAT-EATING

It is our custom in the British Isles to consume large quantities of meat, and, from the highest to the humblest, no meal, with the exception of the more than superfluous afternoon tea, is regarded as substantial without it. The labouring man, who, when I was a boy, was contented with the fat flesh of his pig, is quite as determined a meat-eater as those who sit down to their series of dishes. The advent of Australian mutton and American beef was regarded as a blessing to the poor, but, as we shall see in a succeeding chapter, foods of a much superior character are at all times obtainable at much smaller cost. Until, by a process of education, people have learned to appreciate the real value of foods, custom, supported by prejudice, will induce them to gratify the palate and the appetite, and to live to eat rather than to eat to live. I do not draw this conclusion from the

practice of the working-class so much as from those who are supposed to be educated, but who are oblivious to the importance of a knowledge of the functions of food.

THE VIEW OF THE POPULAR DOCTOR

Some years ago, having consulted a popular and titled London physician, I was supplied with printed instructions as to what I should eat and what I should avoid in order to cure dyspepsia. Among the latter were the skins of fruits and vegetables, raisins, peas, nuts, strawberries, currants—fresh and dried—and plum cakes. Meat, fish, vegetables and fruit might be eaten in the form of *purée*, grated or passed through a sieve. In a word, the object appeared to be to dispense with the help of the teeth altogether, and to avoid all foods which contain the essential mineral salts, which are all-important in maintaining the blood in a high state of efficiency, and thus avoiding the troubles which their omission tends to create. Jellies, which possess little or no nutritive value, were permitted with tea, coffee and cocoa—all containing a poisonous alkaloid—biscuits, farinaceous foods, white bread and plain cakes, all deprived of the invaluable fibrous portions of the wheat, were included in the suggested menu. This is an example of a form of advice, all too preva-

lent, which in my experience intensifies the original trouble instead of removing it. It would not be seemly to describe the results of this and similar recommendations made by men of the highest professional rank, but many are simply disastrous.

WE FEED OUR CATTLE MORE CAREFULLY THAN
OURSELVES

There is no branch of education which is of greater importance than a knowledge of ourselves and our bodies, and how they should be managed and fed. Experienced farmers take greater pains in the selection of suitable foods for their horses and cattle than for their own tables. I have been closely associated with the breeding and feeding of the live-stock of the farm on a large scale for a great many years, and intimate knowledge of the science and practice of feeding in this country, in America, and on the Continent of Europe induced me to make a practical study of the feeding of man.

“ DO YOURSELF WELL ”

Men who have passed middle age are sometimes told by physicians to “ do themselves well ”—in other words, to indulge in the usual liberal table ;

to take soup, joint, fowl, fish and *entrée*, with a sweet containing egg, and cheese to assist in digesting the whole. The man who indulges in this form of fare, with breakfast and luncheon of a congenial character, cannot hope to keep well. He may be persuaded that his system demands it, but if he listens to nature, the most faithful of guides, he learns that with time it will kill him, or make him a martyr for life. Animal foods may be eaten in great moderation by young people, but only one at a meal, and that once a day. The man who has reached middle life is much better without them, while later on they are signally dangerous.

We not only eat the *wrong* foods, but a great deal *too much*. I have been forced to this belief as the result of some years of rigid experience. I find, too, that the foods which dyspeptic patients are advised to reject, in accordance with the facts I have already recorded, are precisely those which should be among the most prominent in their daily régime, and that, in a word, instead of scraped meat, minced fish, white bread, farinaceous foods—improperly deprived of the husk—*purées* and cooked fruits—minus skins, fibre and pips—eggs, cheese and abundance of milk, the menu should include very little meat or fish, cooked in the ordinary way, wholemeal bread, cereal foods

with the husks, where this is possible, steamed or baked vegetables, salads, raw fruits of all kinds with the skins and the pips, a moderate quantity of milk, some soft cheese or an egg, and a moderate allowance of butter or margarine. This is opposed to the programme of many physicians, but it confers health, strength, endurance, and that verve which makes living a joy, and gives new zest, new motives, and a new temper to life. The more animal food man consumes the more "animal" his temper becomes, and this, too, is a point of enormous importance, not only to himself but to those depending upon him.

The defence of those who advocate liberality in the use of those foods which are of animal origin is, that they are necessary in the manufacture and repair of the muscular system, and indirectly for the provision of energy. Vegetable foods, however, are equally capable of muscle production, while they are much superior to the lean portion of meat in the production of energy. While, however, I endorse the non-animal mode of nutrition, I do not believe that one small daily portion of meat or fish is an unhealthy addition to the ration of robust young people or adults on the right side of forty. My contention is, that it is a superfluous food, and much too costly for men with small incomes. Apart from these facts it is difficult for

those who have been reared as meat-eaters to abandon the practice, and I am conscious, from facts derived from medical friends who, while permitting their patients to eat it three times a week in moderation, have satisfied themselves that, consumed systematically, it is the foundation of serious physical troubles or of organic disease.

How, then, can we obtain muscle-making food in sufficient quantity if meat and fish are abandoned? My reply is based, first upon scientific demonstration by responsible men, and next upon a prolonged test upon myself. Instead of requiring from $4\frac{1}{2}$ to 10 oz. of meat per day I have been able to maintain much better health, to perform far greater physical exercise, and to accomplish considerably more mental work, with abundant enjoyment, without either fish, flesh, or fowl, than when consuming these foods three times a day. Some years ago I was induced by a chance companion in the January snows of the higher Alps to read *Physiological Economy in Nutrition*, by Professor Chittenden, of the University of Yale. In this work the writer describes how he was induced by the famous Horace Fletcher to commence his great feeding experiments. Mr. Fletcher was himself the first subject of Chittenden, and it was found after months of study of his habits, and of constant observation, that he was able to do

the work of trained athletes with great ease, to maintain constant body weight (165 lb.) upon about one-half the minimum diet which an average man is supposed to require, according to the standards of the most famous authorities, and practically without any meat at all. From a physical wreck he became a strong man solely by eating less food, and making the most of that by perfect mastication. Chittenden then experimented upon himself—his food giving him some discomfort at first; but this soon passed away, and was succeeded by improved physical condition, while a rheumatic trouble of long standing quite disappeared. There were no more headaches or bilious attacks, but a keener appetite, appreciation of simpler foods, and a diminution of the weight of the body. With a large reduction in the consumption of meat and similarly rich foods there was less thirst—a fact which I have found so marked that I seldom drink at dinner, nor, unless on very rare occasions, more than 30 oz. of fluid in the day. With a meat diet much more drink is demanded, with a greater desire for stimulants.

During two periods of six and five days respectively Chittenden made complete experiments to test whether he maintained his equilibrium, or whether he was living partly at the expense of his body. His food was varied with meat, fish,

peas, potatoes, bread, butter, eggs, sugar, cream, cream-cheese, biscuits, puddings and coffee; and, while he consumed only about one-half the recognised quantity which a man of his weight and occupation is supposed to require, that quantity contained only one-third of the minimum standard of muscle-making food. Yet he accomplished more than he asked, for he says: "Greater freedom from fatigue, greater appetite for work, greater freedom from minor ailments, have gradually become associated with the reduced amount of protein (muscle-making food) and the general condition of physiological economy." He adds, if a man weighing 125 lb. can maintain this condition with continuance of health, strength and vigour, with this small consumption of food, why should he load up his system with three times the quantity? Here is a confirmed advocate of meat-eating, undertaking an experiment with a purely scientific object, so convinced by his results that he has no desire to return to the more liberal but unsafe system of previous years. In spite of these facts, and of the results of the more extensive experiments, to which I now briefly refer, meat is consumed by almost all people in liberal quantities, in conformity with the advice of many professional men, who apparently ignore the work which has completely upset the theory to which they are wedded.

FEEDING EXPERIMENTS ON DOCTORS, SOLDIERS
AND STUDENTS

Professor Chittenden next conducted an experiment upon himself and four of his colleagues—three of whom were doctors—and then upon eleven soldiers lent by the United States Government, who were fed for five months upon food which also contained a very small quantity of meat. Two hours were devoted to daily gymnastic exercises, and the result was that the tests which were made showed an increase of 83 per cent. of physical power. Although these soldiers were young, they were fed during the whole period upon rations which were much below those given to their colleagues in the army.

Lastly, Professor Chittenden fed eight selected athletic students of his university, averaging twenty-four years of age, for a period of five months in a similar way. Although the men were in high condition they gained 31 per cent. of physical power, and this upon food containing much less than one-half the muscle-forming food usually consumed by men of their age, weight (150 lb.) and occupation as athletes.

It may be said in support of the vegetarians' argument that animal food is unnecessary, that their champion cyclist was (1912) the finest rider

in the kingdom; that in the great twelve hours' race promoted by the Anerley Club against selected champions of England the only vegetarians represented finished first, second and third—two of these breaking the record for southern roads. It is recorded by Mr. Henry Light, captain of the V.C.C., that whether in cycling, running, walking, tennis, boxing, wrestling, or weight-lifting, vegetarians have made records or won champion prizes. This writer remarks in his essay on *Diet and Endurance*, that, "if vegetarian diet is inadequate we as a club should now be standing at the bottom of the scale instead of at the top."

THE FOOD OF ANIMALS

If we except the carnivorous species, animals are vegetable-feeders, and consequently unable to obtain more muscle-making food than exists in the vegetable world. Nevertheless they are able to construct a perfect muscular system, and to maintain great physical power and endurance. The oat, despised by so many, suffices to impart great strength to the cart-horse and speed to the racer. The elephant obtains food still less concentrated, while the camel, also a vegetable-feeder, combines endurance with strength. It has been pointed out, on the basis of scientific calculations, that when 4 per cent. of muscle-forming food

is deducted for the maintenance of the system, the balance remaining for the expenditure of energy reaches 15 per cent. in the food of rich people, 12·7 per cent. in that of the multitude of workers, and 4·3 per cent. in the food of the poorest. Thus some men consume three to four times as much of this food as they require for their working activity.

Briefly, then, all the muscle-forming food required for our nutrition can be obtained from vegetable sources. Milk, however, an occasional egg, or a small allowance of cheese, which is rich in this substance, are desirable for all healthy persons. The work or energy value of food, too, is greater when the diet is restricted to bread, cereals, pulse, and other vegetables and fruit. Meat, like alcohol, although in a minor degree, stimulates the system more powerfully than vegetable foods, with the result that it is sooner exhausted. Thus, with an increase in the consumption of meat, there is a corresponding diminution in both endurance and energy.

THE OBJECTION TO THE WATER IN VEGETABLES AND FRUIT

It has been frequently pointed out, as an objection to vegetable foods, that they are so loaded with water that a large quantity must be eaten in order to obtain the requisite nourishment. I have

already remarked that, on a vegetable diet—and this includes fruit—thirst is almost a phenomenon. Although I am not a vegetarian, but a rare eater of meat, I have never experienced pronounced thirst since vegetable foods have formed the foundation of my diet. On the other hand a liberal quantity of fluid is essential to the meat-eater, and the more meat he consumes the more drink he requires. Water is essential for the purpose of dissolving and secreting the products of the decomposition of meat. The quantity of water consumed, however, is just as uniform as that present in a given weight of fruit, but in reality the consumption of water in a fruit diet is less than on a diet of meat.

THE IMPORTANCE OF THE MINERALS OF FOOD

The value of the mineral constituents of food is usually overlooked, not only by the public in general, but by many professional men. Although they are indispensable to life, the proportion is so small that it is regarded as a negligible quantity. Let us see how far this is true. An infant is nourished solely on milk. This food, as derived from the mother's breast, contains only .30 per cent. of mineral matter—*i. e.* less than one-third of an ounce, in 100 oz. ($6\frac{1}{4}$ lb.). Of this very small quantity phosphate of lime forms slightly more

than one half. If, therefore, a child takes $6\frac{1}{4}$ lb., or five pints of milk, daily, it consumes about one-sixth of an ounce of this substance, which is essential in the formation of bone. Supposing, however, before drinking the milk it were possible to extract this material, the child could manufacture no bones. Phosphate of lime, iron and other mineral substances are essential to health and to life, although large numbers of people obtain them in much smaller quantities than nature demands, because they reject those portions of food in which they are present—and they suffer accordingly.

VALUE OF THE SKINS AND FIBRES OF FRUIT AND VEGETABLE FOODS

I may refer—to take one example—to the mineral value of the whortleberry. This wild fruit, about the size of the black currant, has a somewhat thick skin, which contains the chief mineral constituents just as the mineral matter of wheat is chiefly found in the husk. Thus, while the whole wheat grain contains 1·7 per cent. (about $1\frac{3}{4}$ oz. in 100 oz.) of mineral substances, and white flour $\frac{3}{4}$ oz., the germ contains $4\frac{1}{2}$ oz. and the coarse bran $5\frac{1}{2}$ oz. Oatmeal, again, contains $6\frac{3}{4}$ oz. per 100 oz. of minerals, and rye flour 4 oz. These figures are of necessity approximate, for no two samples are identical, but they demonstrate the

fact that the skin, or husk—the portion which we discard in our twentieth-century civilisation, with our bad teeth and worse stomachs, because of the bad treatment they receive—contains food of vital importance.

The animal living entirely on vegetable foods makes no discrimination as to what part of the grain or the root it rejects, although it selects particular species, but it is able in consequence to obtain all the minerals that its system requires. Man, on the other hand, sacrifices utility to pleasure—rejecting what disagrees with his palate.

The skins and fibres of vegetable foods, however, play another important part in the maintenance of health. Most intelligent people are aware that health largely depends upon the regular and perfect action of the intestines. This, however, is greatly affected by diet, and as people grow older many resort to aperients, with results which are often disastrous. Drugs are practically unknown to those who systematically consume wholemeal bread, fruit and vegetables with the skins. The skins of fruits, as of vegetables, are natural laxatives, for they not only contain mineral salts, like magnesia, but they incite mechanical action of the intestines as they pass through them. Where foods, like those produced from fine flour and other materials made into an almost liquid condition,

form almost the whole of the diet, as they do with thousands of invalid people, who regard them as a panacea for dyspepsia, this action is more or less paralysed, drug-taking becomes a regular habit, and the last state becomes worse than the first. If health so largely depends upon the regularity to which I have referred, it also depends upon a clean, healthy track through the body. This form of cleanliness is practically ensured by the regular consumption of the skins and husks of food which, acting like a broom, sweep all before it in passing through the system.

CHAPTER III

THE FUNCTION OF FOOD

FOODS are usually divided into four groups of constituents—fat and oil, starch and sugar, the muscle-making material known as “protein,” and the minerals which are especially essential in building the bones and the teeth and in maintaining the richness of the blood. The first three groups are able to provide heat and energy. The fats and oils, however, possess two and a quarter times the value of starch and sugar for this purpose, but neither have the property of building or repairing any portion of the muscular system, which includes all the organs of the body. This is the function of protein alone, although a very small quantity is required by the adult, and that for repair only. Protein is the sole food constituent of flesh, apart from the fat, but it exists in a less stimulating and more healthy form in all vegetables and fruits in sufficient quantities for all our requirements.

A CITY MAN'S LUNCH

Let us take an example of the average diet of a city man who dines at a popular restaurant on the

following food, which represents quite a modest repast compared with what I have frequently seen him enjoy : 4 oz. of roast beef, 6 oz. of potatoes, 3 oz. of bread, 2 oz. of cheese, and $\frac{1}{2}$ oz. of butter. This represents an extravagant proportion of muscle-making food which is present to the extent of three times the necessary quantity. Obviously, however, when meat and cheese are eaten together, with potatoes and bread, there is no room for anything else in the luncheon of a moderate man. In this case half the meat and all the cheese should be replaced by green vegetables or some cereal pudding and fruit.

In discussing this subject it is necessary to employ two or three technical terms, with which some readers may not be acquainted. There is no royal road to knowledge, and those who really desire to understand the functions of food will not be deterred by this introduction, which is the key to the whole subject of nutrition.

Food, as suggested above, is divided into four groups of constituents, each group performing particular and necessary functions in the nourishment of the body—in providing for its repair, its warmth, and the exercise of energy, or mental and physical power. These groups are—

1. *The Proteids.*—The nutritious substances in

the lean or muscular tissue of flesh, fowl, and fish, the albumen of egg, the casein or curdy matter of milk, the legumen of peas, beans, and lentils, and the gluten of wheat, are all familiar examples.

2. *The Carbohydrates.*—These constituents are chiefly confined to starch and sugar. Gum and the material known as cellulose, of which the cell-walls of plants are chiefly constructed, are also Carbohydrates.

3. *The Fats and Oils.*

4. *The Mineral Salts.*

The chief function of the Protein of food is that of building and repairing the muscular system and of assisting in the construction of the bones. Protein—apart from the fat—is the sole nutritious constituent of animal food—milk alone excepted, for milk contains sugar—but it also exists in a less stimulating form in vegetables and fruits.

The function of the Carbohydrates is the provision of heat and energy, while they are also employed in the construction of the fat of the animal body.

The Fats and Oils perform similar functions to the Carbohydrates; two and a quarter parts of the latter are required in the production of heat and energy for every part of the former. Protein,

however, as it contains carbon, also possesses the power of producing heat and energy.

The importance of the Mineral Salts—which include lime, phosphorus and iron—will be better realised from the fact that the two former are the chief constituents of the bones.

It has been pointed out that the principal carbohydrates are starch and sugar; of these two all important foods something must be said.

STARCH AND SUGAR

Starch or *Sugar* forms a large proportion of all the most popular foods of a vegetable character, while sugar is an important constituent of milk. Starch, for example, forms nearly three parts of the weight of white flour. It exists in still larger proportions in rice, cornflour and sago, while in oats, barley, rye, beans, peas and lentils it forms from one-half to two-thirds. Starch is also the prominent constituent of potatoes, and of various other garden vegetables. In a word, it is dominant in most vegetable foods, and therefore forms by far the greater portion of the nutritious matter which we consume. It exists as grains or granules of varying forms, packed in cells, which are beautifully revealed by the microscope. Commercial starch is so commonly associated with the laundry that its great rôle in food is somewhat obscured. Starch

will not dissolve in cold water, but when a food, such as rice, in which it exists in abundance, is boiled, the heat ruptures the walls of the cells in which it is enveloped, and it swells, and becomes more readily amenable to the influence of the saliva and other juices which digest and prepare it for absorption into the blood. When subjected to dry heat starch becomes soluble, and this fact is marked in the case of well-browned dried toast, which is therefore more easily digested than bread. It is not, however, advisable to abandon bread and to eat toast in order to avoid indigestion, as the remedy would be worse than the disease, for the more we depart from nature's rules the more difficult they are to restore.

Sugar is said to be the purest of known foods, but although their composition is closely identical, it exists in various forms. Thus we have the *Cane-sugars*, the most important of which are those produced from the sugar-cane and the beet, which now forms so large a portion of the table sugar of commerce. *Milk-sugar* is referred to in the discussion on milk. *Grape-sugar* is found chiefly in the grape; and *Fruit-sugar* in a large variety of fruits of other kinds. Although a sample of light brown Demerara cane-sugar with its handsome crystals is distinguishable from *Beet-sugar*, the two forms are now so similar that few consumers can

differentiate. When the question of value arises, beet-sugar is the cheaper, nor should it be condemned on account of its colour.

Malt-sugar may be briefly referred to, inasmuch as it forms an important feature in Extracts of Malt. It is produced from the starch present in barley, which, with the assistance of moisture and heat, is converted into sugar through the action of a diastase ferment. *Invert* sugar is produced when cane-sugar is boiled with fruit in the process of preserving. It is a combination of cane-sugar and the sugar of the fruit—the change being effected by the action of the heat and the fruit acid. *Invert* sugar is less sweet than table sugar, but, like fruit-sugar, much more easily assimilated, for it is partially digested. Many persons who cannot digest cane or beet sugar without inconvenience can take preserved fruits, while others can also take large quantities of sugar in raw fruits. Bearing these facts in mind, sufferers from dyspepsia will be well advised to dispense with sugar in their tea and coffee *or* on puddings and stewed fruit after cooking, and to take it *in* jam, marmalade, puddings, honey and similar dishes. For the preservation of fruit cane-sugar is the best. Raw sugar is liable to produce irritation of the stomach in some constitutions, and this is followed by the secretion of mucous. If taken at all in such

cases it should be in very small quantities, and well diluted, otherwise it is liable to seriously interfere with digestion. Bearing in mind the fact that fruit-sugar is a natural food of very great energy value, and specially adapted to almost all ages and constitutions, ripe fruit should be much more extensively eaten, especially as it possesses other equally great characteristics. Some young and active persons are able to eat four ounces of sugar in a day, this providing nearly 500 units of energy at a cost of three-farthings when it is 3*d.* a pound, or of one-halfpenny when it is 2*d.*

Treacle in its various forms is not so useful as sugar, containing as it does only two-thirds to three-fourths of its weight of sugar, the balance consisting of water and impurities.

THE FATS AND OILS used as food are comparatively few. Animal fats are chiefly confined to the products of cattle, sheep, and pigs, and these include butter, margarine, lard, dripping, and suet. Large quantities of fat, however, are present in ducks, geese, and crammed chickens, and in such fish as salmon, turbot, and herrings. Among vegetable oils the new form of margarine has largely increased the utilisation of those of the palm and the coconut, the pea-nut and cotton-seed, while the oil of the olive is both popular and valuable, although it is often heavily adulterated. Olive oil is more completely

absorbed than a solid fat like butter; while butter, like the fat of milk from which butter is made, is more easily absorbed than the fat of meat—especially of mutton and beef. For this reason the oil of margarine, with its low melting-point, is a more valuable food than suet and other hard animal fats. Thus a much larger quantity of butter fat can be consumed when taken in milk than the fat of the joint, which, like suet, contains a large proportion of stearin—a fat with a high melting-point used in the manufacture of candles. If too much fat is eaten a portion is wasted, passing through the body unused; the quantity which can be digested, however, varies with the individual. Fats have hitherto been regarded as expensive portions of our diet, and, measured by the market value of butter and salad oil, this belief was well founded. The introduction of vegetable margarine, however, has reduced the standard of cost of fat, without reducing the standard of efficiency.

PROTEIN.—The most important of the various forms of protein are the gluten of wheat, the casein of milk, the albumin of egg, the legumen of pulse, and the myosin of meat. It has been customary to describe protein as a flesh-former, but this term must not be translated improperly. Most people regard meat as flesh just as it comes

from the butcher, and they are perfectly right; but as meat embraces the fat with the lean or muscular tissue, the term flesh-former cannot be intelligently applied to a food constituent the special function of which is the manufacture of the muscular portion of the body alone. Protein is essential in the manufacture of milk, the casein of which cannot be constructed unless it is present in the food of the cow.

OBJECTIONS TO DIET WITHOUT MEAT

It has been claimed that liberal meat feeding supplies a form of nerve energy and brain power which is impossible to the vegetable feeder; that it enables man to resist disease more effectively; that it is essential to children; and that during an illness a patient who is not a meat eater has no balance in the bank to fall back upon. I have referred to the work of Chittenden, who is supported by Bircher, and Hindhede—all of whom have performed original work of the first rank, and who have disproved, not only on themselves but on various classes of men, every one of these claims. The work of Hindhede with his own children, and of Bircher with women and children, as well as with men of numerous nationalities, many of whom I have met, is a complete answer to these claims, although it is just to add that

many celebrated Englishmen deplore the excessive consumption of meat. If I may venture to add my own testimony, it is to the effect that the results of a diet without animal food have been precisely the opposite of those which are claimed against it.

It may be pointed out here that *one of the cheapest sources of protein is skimmed or separated milk*, although, owing to the removal of the cream, the public are prejudiced against it. While they insist on meat on the one hand, they reject this "meaty" milk because of its cheapness and its name on the other. I know of no better example of the importance of the study of foods.

It has been remarked that there is a loss during digestion of the protein of pulses, cereals, and potatoes to the extent of 10 to 30 per cent.—the loss in the potato standing among the highest of all. And yet in the Danish investigations men have lived solely upon potatoes and margarine for several months in succession, while in Ireland whole families have lived upon potatoes alone. With this fact I am well acquainted, as during the famine of 1897-8 I visited hundreds of families in Donegal, Mayo, Galway, and Clare on behalf of the *Manchester Guardian*—my report being discussed at great length in the House of

Commons. I saw the food of those who were living on a normal diet as well as those who were starving, and am able to testify to the great value of the potato as food, where neither bread, meat, nor milk were available. A low meat diet is more desirable for men of sedentary occupations than for those engaged in manual labour, for there is less muscular waste to repair. Liberal meat-eating makes a demand upon the organs of the body in the process of digestion and secretion which unfits them for mental work. How can we point to more striking examples than to those who, in middle or later life, are unfit for work in their office or their study after a luncheon upon meat, or of fish, or of both, followed by cheese? The farm labourer, the gardener, or the carman is not affected in a similar way, although these men can do much better work without meat.

CHAPTER IV

THE VALUE OF FOODSTUFFS

FOODS may be valued in accordance with the cost of their constituents as compared with the cost of the same constituents in bread and margarine, taken as standards, or on the basis of the number of heat or energy units or Calories¹ which these foods provide for a given sum of money. Neither method is perfect, but the latter is the more useful of the two, and that which is generally adopted in arriving at the energy value of all foods. We can compare the cost of starch, which is the chief food material in rice, macaroni, oatmeal, or any other cereal, with the cost of starch in bread, but we cannot make an equally close comparison between the protein of meat or cheese, or of the fat of butter or lard, with the protein or fat in bread, for obvious reasons. The protein of bread is not utilised by the system so perfectly as the protein of meat, while the fats in butter, lard, and bread possess varying market values weight for weight, hence margarine is a better standard for fat.

¹ A Calorie (the standard employed in measuring the heat value of foods) indicates the quantity of heat required to raise 1 lb. of water 4° F.

If we take bread as a standard, and value it in units, we shall find a penny will buy 600 when the cost is *2d.* a pound. When rice costs a similar sum, a penny buys 800 units, but immediately the price rises to *3d.* a pound the units purchased by this sum fall to 533. Again, a piece of beef of medium fatness, costing *10d.* a pound, provides 850 Calories to the pound, so that a penny buys only 85 Calories, and it is in this way that we are able to estimate the economical value of different foods by this particular system. A poor man who is led to believe that by the purchase of a cheap joint of lean meat, to be eaten with bread and potatoes, he can feed his family with greater economy than with food of a much simpler character, may find that while he is spending more money he is providing considerably less nourishment. Let us illustrate this fact with a ration consisting of 3 oz. of meat at *1s.* a pound, 3 oz. of bread, and 4 oz. of potatoes per head of a family consisting of a man, his wife, and three children.

RATION I

	Cost.	Calories.
15 oz. Meat	$11\frac{1}{4}d.$	765
15 oz. Bread	$2 d.$	1080
20 oz. Potatoes	$1\frac{1}{4}d.$	435
10 oz. per person.		
Total cost	<hr/> $1s. 2\frac{1}{2}d.$	<hr/> 2280

The above provides a liberal supply of protein, but in order to make it equal to the following ration it would be necessary to increase it in quantity by 75 per cent., when its cost would amount to 2s. 2d. Thus, while in one case the ration would amount to nearly 5d. per head, in the other it would cost only 1 $\frac{7}{8}$ d. In other words, *the second ration, while providing over 60 per cent. more nutritive matter than the first, would cost less than the meat in that ration.*

RATION II

	Cost.	Calories.
15 oz. Bread	2 d.	1080
20 oz. Potatoes	1 $\frac{1}{4}$ d.	435
4 oz. Margarine	1 $\frac{1}{2}$ d.	900
6 oz. Rice	1 d.	600
2 oz. Sugar	$\frac{3}{8}$ d.	225
3 pints skim milk for rice pudding	3 d.	480
Approximately 17 to 18 oz. per person.	<u> </u> 9 $\frac{1}{8}$ d.	<u> </u> 3720

This ration, which can be varied in a hundred ways, is intended to demonstrate the economical side of nutrition. The cost of meat, and its low nutritive value, must ever prohibit that variation and liberality in providing a repast, where it is regarded as an imperative dish, in the homes of those who have little to spend. I am happily

connected with a philanthropic institution in which the children and staff were fed before the war with great skill and generosity at a cost of 2*s.* 9*d.* per head per week. They maintain wonderful health, and as a group are models of what growing children should be in their physical, moral, and intellectual life—a large number of the old boys going to the front in the early days of the war. These results are owing to the generous allowance of foods, of which meat forms a very small portion, to exceptional skill in its arrangement, and the personal care of the lady superintendent, who regulates every detail.

THE ARRANGEMENT OF RATIONS OR MEALS

We have seen that while it is important that we should obtain a sufficient quantity of each of the four groups of food constituents in what we consume, we should not eat too much of either. Apart from the question of nutrition altogether, there is a limit to the quantity which can be eaten without sickness or harm, although that limit may vary with age, occupation, or constitution. The young can eat sugars and fats, as in sweetmeats and cream, with a degree of impunity, where adults, and still less those who have passed middle age, dare not make the attempt. It is

important to recognise that a meal should consist of *mixed* foods. This ensures more perfect digestion, and as a rule establishes an approximate equilibrium or balance between the various constituents. *Thus, if at dinner the dishes consist of a small plate of meat or fish, potatoes, a green vegetable, wholemeal bread, a cereal pudding, with preserved or fresh fruits, the consumer, eating rationally, obtains an ample supply of all the necessary nutrients, while at the same time he is providing the mechanical help without which no ration is perfect.*

If, however, for reasons of economy, meat is omitted, its place may be taken by fish, some varieties of which are much cheaper, or, better still, by a third vegetable in the form of dried or preserved peas, beans, or lentils—unless the two former can be purchased green and fresh, and are equally cheap. These three foods are not only much richer in protein than lean meat or fish, but they contain large quantities of starch. Where, too, meat at 1s. a pound provides only 60 to 100 units of energy for a penny, according to its fatness, the pulses referred to provide 550 when their cost is 3d. a pound. It should be added, however, that the protein of vegetables, and especially of the pulses, is less perfectly absorbed during digestion than the protein of meat.

INFLUENCE OF COOKING

Those foods which possess the greatest energy value are *raw* milk, eggs, young tender vegetables, salads, and nuts, followed by bread, *cooked* cereals, fruits, vegetables, milk and eggs, butter and curd cheese. Among the least valuable producers of energy are meat, fish, poultry, game, mushrooms, cocoa, coffee, tea, and alcohol (Bircher).

Cooked food possesses a smaller nutritive value than raw food. In most cases, where vegetables are boiled, and especially peeled potatoes, there is a direct loss of food material which passes into the water in which they are cooked. Oatmeal porridge, as cooked in Scotland, must be chewed and masticated. In most English houses, however, it is assumed that if it is cooked to a jelly it is more digestible. The result is, that it is swallowed without mastication, and therefore not mixed with the saliva which nature provides for the purpose of assisting digestion, and in consequence overcooking causes the trouble which it is intended to avoid. It is quite true that cooking breaks down the starch cells of cereal foods, which are in consequence brought into immediate contact with the saliva and other digestive juices, and that the starch in cooked oatmeal is more quickly converted into sugar than that in raw oatmeal, but where there is no mastication this advantage is lost. "The

greater the change in the transformation of food between its origin in animals and vegetables and its presence on the table the greater the loss of its value." For this reason foods which can be consumed in their natural condition are the best sources of nutrition, and these include most of the fruits, nuts, and salads.

Man has a great range of foods from which to select, and as his vitality is almost entirely derived from the food he consumes, he is wise to rely upon its utility rather than upon his appetite, although there are occasions when desire for a given food is a provision of nature. Nor should he eat in accordance with his weight, for meals should be governed by the expenditure of energy, although it is obvious that, as food is a source of heat, less is required in a warm climate than in a cold one, and in summer than in winter. The resting man requires less than the active man. Thus there is less loss when sleeping than when lying awake, when standing than walking, and when writing at the desk than when working with the muscular system.

Cooking exerts great influence upon food. Thus the mineral salts present in vegetables are almost entirely lost in the process of boiling, unless the water employed is utilised. Cooking, however, changes their condition, and doubt has been expressed as to the power of the system to assimilate

these nourishing materials, which are so much superior in the raw plant, its root or its fruit. In no case is the energy value of cooked food—and an apple is an excellent example—so great as that of the raw material. It is customary to use salt with great freedom, but it has been shown that an excessive quantity checks the action of the digestive juices, and diminishes the nutritious value of food. Cooked meat appeals to the palate, but it must be obvious to a careful observer that the great meat-eater is physically inferior to the labouring man who eats no meat at all—fat bacon excepted. Bircher has shown that the dynamic and dietetic action of meat results in a loss of 32 per cent. of energy, and that the more man consumes the smaller are his powers of endurance and capacity for work. He adds: “With abundance of meat the uric substances, and therefore the work of the kidneys, are unnecessarily increased, the whole system is flooded with albuminous products, and constant danger threatens the well-being of the body and the organs burdened with the work of secretion, and diminished power of resistance to bacteria.”

There are few vegetables used as food which can be eaten raw, and they are practically confined to onions, lettuce, endive, celery, cress, mustard, radishes, cucumbers, and tomatoes. To some persons the bare idea of eating either, to say

nothing of all, is regarded as an invitation to indigestion. This fact, however, is sufficient to reveal to us how erroneous impressions may be. *Eaten in moderation, and well masticated*, these raw foods are not only digestible, but they possess great nutritive and physical value, much of which would be destroyed by cooking, and one or more—lettuce first of all—should always be upon the lunch and dinner table.

EXAMPLES OF AUTHOR'S DIET

The diet to which I am accustomed consists largely of raw fruit, and as I can exhibit no better proof of its value, and of the sufficiency of a very small proportion of animal food, I give some examples in detail. *All fruits* fall into line, and I know of no variety which it is desirable to exclude. In summer, when our native fruits are abundant and varied, there is plenty of choice, but in autumn one is restricted to plums, damsons, pears, apples, grapes, and oranges until winter arrives. Plums and sometimes pears then disappear, and finally grapes, leaving the field occupied until summer comes again by apples, oranges, bananas, and preserved fruits in smaller proportions.

Breakfast and supper (or dinner, if the term is preferred) consists, with little variation from October to June, of apples grated with the skin, mixed with a piled tablespoonful of oatmeal,

P. R. Breakfast Food, or Grape Nuts, or half the quantity of prepared oats, soaked for twelve hours, a dessertspoonful of condensed milk, and two or three piled teaspoonfuls of ground nuts. The whole makes a large plate of porridge. This with whole-meal bread and butter, a cup of coffee (free from caffeine) made with milk, constitutes the meal. As appetite dictates, however, it is supplemented with fruits of other kinds, a few nuts, and sometimes an egg, or a small piece of fat bacon for breakfast in winter. The porridge may be varied extensively; one apple and one squashed banana, a banana and an orange, or some prunes, are excellent substitutes for apples alone. The oatmeal, too, may be varied with rice, barley, semolina, macaroni, or maize-flour. In summer, plums, apricots, or whortleberries are all delightful changes—the last-named being the most beneficial of all. There is no hard-and-fast line in the case of those who have mastered the principle, and who have learned that fruit is as distinctly a food-stuff as meat, or any other material of an animal character. If white bread, white toast, or an egg, or fried bacon are preferred as an occasional change, there is no reason why a rational man should refuse it, if he is young and robust; but where a principle is broken too often it ceases to be a principle at all, and the old practice returns. Of that practice which prescribes meat three times

a day, commencing breakfast with eggs or kidney and bacon, fish or a mutton chop, followed by fish and joint at luncheon, and several courses at dinner, I have no more to say than that, on the authority of the greatest observers, it is not only destructive of health, but of life, and is paralleled only by the excessive consumption of alcohol.

The midday luncheon consists of an occasional small plate of cereal, pulse, or vegetable soup, two or three vegetables with sauce, a savoury made with rice or spaghetti and tomatoes or curry, a farinaceous or milk pudding with stewed fruit, light dried fruit pudding, or simple confectionery, wholemeal bread and butter—sometimes a small piece of cheese—salad whenever available, and a claret glass of non-alcoholic wine or cider when it can be obtained, although the real thing is not made in England. Fruit as desired completes the repast.

EXAMPLES OF MEALS

(The weights are approximate)

oz.	BREAKFAST	Units of energy.
3	Bread	235
1	Butter	230
10	Milk Coffee (Caffeine free)	150
8	Apples, Oatmeal, Grape Nuts, and Condensed Milk	220
12 oz.,	without Milk Coffee	835
Plus more fruit, fat bacon, or an egg, as desired.		

LUNCHEON

oz.		Units.
1½	Bread	120
	Cheese	40
½	Butter	115
	{ Potatoes	60
	{ Parsnips	45
	{ French Beans	30
3	Pudding	200
	Salad with Oil	40
3	Orange	30
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14 ounces	680

Plus sauce to vegetables.

DINNER OR SUPPER

oz.		Units.
3	Bread	235
1	Butter	230
10	Milk Coffee	150
7½	Apple and Banana, Condensed	
	Milk and Nuts	185
4	Milk Pudding	120
<hr/>		
15½ oz.	without Coffee	920

Total 2435 units, without the additions referred to.

These three repasts are supplemented by an orange, or a small cup of coffee, at five o'clock, with a slice of coarse bread and butter, or toast, or a small piece of plain cake, when the last meal is delayed by the duties of the day, or for any

other tangible reason. In this case from 50 to 200 units are added to the total. It will be observed that the protein consumed is almost wholly confined to that present in milk and vegetable foods—the daily average seldom exceeding 80 grammes ($2\frac{3}{4}$ oz.), unless on those rare occasions when a small portion of meat or eggs form part of the menu, as when staying from home, or dining with friends.

It has been urged that in order to obtain the requisite nourishment it is necessary, when meat and other animal foods are not included in a diet régime, to eat more, and thus to overburden the stomach. There is no occasion for this, but I have observed that young people with fruit placed before them in great variety are prone to eat more than they need, although I know of no instance in which they have complained of indigestion in consequence, if it is ripe. Meat-eating, as already remarked, is always accompanied by a desire to drink, and the larger the consumption of animal food the more that desire is emphasised. On the contrary, there is, in my experience, no thirst where the chief meal is composed entirely of vegetable foods and fruit. *The water for which nature would crave under other conditions is taken in the food*, and is of greater value than any of those liquid concoctions which man has invented.

This absence of thirst is of portentous value in this system of diet, for it practically excludes alcohol.

It is assumed by medical science that a man needs 40 oz. of liquid per day. Many persons take very much more, and what they sow in this way they are certain to reap. Large draughts of water at dinner are incentives to trouble, causing distention and pain, and diluting the juices which nature provides for the digestion of food. If drinking is inevitable it is better between meals than at dinner, in those advancing in years, or who cannot take liberties common to youth. Large draughts of hot, or cold, or mineral water are frequently taken for particular reasons by the advice of medical men, but, like the water cure of a German spa, they are no remedy for bodily troubles caused by persistence in eating too freely, or in eating those foods which are destructive of health. The food described in the above tables includes 42 oz. of water, without taking account of the fruit frequently eaten at the close of a meal. If the consumer of the usual English meal drinks, as he certainly does, a great deal more than this quantity, which is slightly in excess of a quart, he increases the bulk of what he has eaten still more than the non-meat-eater.

CHAPTER V

WHAT WE SHOULD EAT

I HAVE been impressed on many occasions with the inappropriate character of the food ordered by those who take their mid-day repast in the popular restaurant. Young men and women employed in offices, shops, and warehouses, have little to spend on their food when from home, but they appear to take no trouble whatever in selecting what is best for their purpose. A light, nutritious, varied, and yet inexpensive meal is of the highest importance. On the contrary, however, many select sausage, meat-pudding, or pie, or a steak, with a new roll and potato, and finally one of those artistic examples of the pastry-cook's art, which may appeal to the eye and the palate, but which are wholly unsatisfactory. I take a few examples from life, and compare them with much more economical foods selected from the restaurant lists.

oz.	No. 1	Units (approximate)
3 Sausage (good Pork)	250
5 Potatoes (mashed).	115
4 Bread	300
12 ounces	<u>665</u>

Cost, 6*d.* Providing 111 calories for a penny.

oz.	No. 2	Units (approximate)
8	Beefsteak Pie	430
5	Potatoes (mashed)	115
	Coffee, with milk and sugar	80
		<hr/>
		625

Cost, 11*d.* Providing 57 Calories for a penny.

oz.	No. 3	Units (approximate)
2	Rice fried in margarine with onions and herbs	220
4	Wholemeal bread	300
4	Fried potatoes	100
2	Margarine for frying and for bread	420
3 to 4	Fruit	40
		<hr/>
15 ounces	1080

Cost 4*d.*, or 250 Calories for a penny.

oz.	No. 4	Units (approximate)
6	Dumpling made with 2 oz. chopped suet and meat with onions and herbs	400
2	Currant cake or jam roll	200
2	Bread	150
1	Cheese	125
3	Lettuce or beet with oil dressing	100
		<hr/>
14 ounces	975

Cost 6½*d.*, or 150 Calories for a penny.

EXAMPLE OF A MORE ECONOMICAL MEAL

oz.	Units (approximate)
8 to 10 Macaroni, made with milk, and raisins or grated cheese	450
4 Wholemeal bread	300
1 Margarine, or 2 oz. soft cheese	200
4 Apple, orange, or banana, plums or cherries	50
	<hr style="width: 10%; margin: 0 auto;"/> 1000

Cost, $4\frac{1}{2}d.$ to $5d.$, providing 200 units for $1d.$

2 oz. Macaroni are cooked with $\frac{1}{2}$ pint milk, 1 oz. raisins, and sugar.

The cost of meat as a regular food not only renders it uneconomical, as the figures which represent its nutritive value suggest, but where those figures are increased by the addition of another article of food, to make a meat meal efficient, the quantity eaten is more than is desirable, and the cost is too great, while the increase in the protein renders it inappropriate for all adults but the muscular worker. In an article in the *Daily Mail* on April 19, 1915, a physician says: "The prime fault in the diet of well-to-do English people is undoubtedly that it consists too largely of meat, fish, and eggs. Many investigations have been made in recent years on this head, and

practically all inquirers concur in the view that far too much meat is eaten, especially by those who lead comparatively inactive lives. To this fact many evil consequences are due. An immense amount of labour is thrown on the kidneys, through which organs the great bulk of the waste products of meat and fish are excreted. These waste products remain long in the blood, as *the kidneys cannot keep pace with the work they are burdened with*. Circulating through the brain, heart, liver, and every part, they act as mild poisons, causing heaviness, drowsiness, sometimes headache, sallowness of the skin, and other minor troubles. Then, towards middle life, the meat-eater's kidneys begin to fail, his heart feels the stress, his liver suffers, and, perhaps worst of all, the arteries of his brain become more or less diseased. Or perhaps he is punished by recurring attacks of gout or rheumatism. This is no exaggerated picture. It applies to a very large number of men and women. But, while eating too much meat, we consume an insufficiency of vegetables for the health of the body."

This is precisely the view that I have advocated in the *Daily Mail*, the *Evening News*, and elsewhere, and the whole question at issue could not have been put more concisely or truthfully. It is generally assumed, however, by those who insist on a mixed

diet, or a great preponderance of vegetables and fruits, that to young people meat is a necessity as a body builder. I have already shown, on the authority of the most able modern experimenters, that this is not so. It is impossible to be acquainted as I am, with growing children who have never eaten meat; with the fact that the Japanese are non-meat-eaters, that the magnificent Sikhs, with their courage and resolution of character, eat meat only two or three times in a month; and that the Arabs, and other hardy races of men, live chiefly upon figs, dates, bananas, and milk—and to insist that meat is a necessity.

A TYPICAL MEAL

An economical and nutritious dinner may consist of a cereal or vegetable soup, potatoes, baked or fried parsnips, salsify, or carrots, and a second vegetable—turnip, cabbage, sprouts, cauliflower, spinach, celery, beetroot, leeks, or onions—a good helping of savoury macaroni, spaghetti, rice, polenta fried in cakes, or buckwheat cakes, and a sweet pudding made with dried fruit, or the addition of jam. The last named may be alternated with fresh fruits in season. These dishes can be prepared in various ways with a little study of modern cookery, and may be supplemented in summer with green beans and peas, or in winter

with dried peas, haricot beans, or preserved French beans. Wherever possible lettuce should complete the meal, with a slice of bread-and-butter or soft cheese.

THE JAPANESE DIET

I have referred to the Japanese, who have shown by their rapid advance to the front rank among the great nations of the world that they are possessed alike of remarkable mental and physical energy. Their virility and power, however, has been built almost entirely on a vegetable diet, for by far the larger proportion of the Japanese are vegetarians. The meat and milk produced in Japan is not sufficient to provide a normal European ration once a day for the wealthier class; and, although fish is consumed much more abundantly, it too is insufficient for this purpose. Some years ago an inquiry was made in order to ascertain whether it was possible, by changing the diet, to increase the height of the people, but it was determined that the point was quite immaterial when it was remembered that, as compared with taller races, the Japanese were not only stronger, but capable of greater endurance. Many instances of both these qualities have been published, but one must suffice here. Professor Baeltz,¹ formerly

¹ Hindhede, *Protein and Nutrition*.

physician to the Mikado, describes an instance in which two young men ran with him in a jinrikisha some twenty-five miles daily for three weeks during warm weather. They consumed abundance of vegetable food—chiefly potatoes, barley, rice, chestnuts, and other materials containing *less than two-thirds of the minimum quantity of protein usually prescribed as essential*, and very little fat. When these men attempted to do the same work upon a partially meat diet, supplied to them as an experiment, they failed, and abandoned it in consequence. The Japanese soldiers are notorious for their endurance upon a vegetable diet, of which rice forms the leading feature, but they are also great eaters of salads and tomatoes.

THE CONTINENTAL PEASANTRY

I have had some experience among the peasantry in the Italian provinces of Lombardy and Emilia, and have noticed there and elsewhere their great muscular strength and endurance. They are practically all vegetarians—their food consisting chiefly of polenta, a product of maize, and rice. The maize plant is indeed, in some parts of Italy, the source of their food and their fuel, while their beds are made with the leaves.

I have repeatedly noticed that in the rural districts of France the diet of the peasants consists

almost wholly of vegetables and fruit, and is the produce of their land. The exceptions are milk, soft cheese, fat used for frying their dishes of maize, rice, and buckwheat, and an occasional egg or a rabbit. Meat is not an item of importance among the agricultural labouring classes of the Continent, and in parts of some countries it is almost unknown. On one occasion I spent a day upon a Danish farm which was notorious for its production of butter supplied to the King. I dined with the family and five robust dairymaids, but, with the exception of meat cooked for myself, all fared alike upon rice, potatoes, bread, and butter. Until the advent of Australian mutton and American beef our English labourers lived in a similar way, but with the addition of fat pork, or bacon, the produce of their pigs.

CHAPTER VI

THE MOST ECONOMICAL FOODSTUFFS

IT will now be convenient to discuss the merits of those foodstuffs which are of the greatest importance to the people of these Islands.

Bread.—The evolution of bread from white flour corresponds with our more luxurious method of living, and the abandonment of the millstone, which refused to remove from the flour its vital constituents, or—to quote speakers at the 1914 meeting of the British Association which has condemned it—its “Vitamines.”

The food value of bread cannot be adequately measured in units of energy. The 30 per cent. loss in weight in wheat which is ground into white flour is equivalent to its loss of food value, while at the same time it diminishes the size of our national loaf. Can we afford this when wheat reaches 60s. to 80s. a quarter? Can the consumer afford to lose what is rejected, and what means so much to his health, and still more to that of his children? The rejection of the bran and germ of the wheat in the modern process of milling means that if wheat were ground into meal instead of white flour, a year's consumption by 46,000,000 people at the usual 6 bushels a head, would fall

from 276,000,000 bushels, costing an average of 55s. 6d. a quarter, in the middle of 1915, to 193,000,000 bushels, thus effecting a saving to the country of £28,750,000 a year, and enormously improving the vigour of the race.

Bread is composed of starch, gluten (a proteid), a very small proportion of fat, some minerals and water. Thus, a four-pound loaf contains approximately 2 lb. of starch, 5 oz. of protein, some fat and minerals, and 25 oz. of water. There are only two forms of ordinary bread which need discussion in a work of this character—those made respectively from fine white flour and wholemeal. “Brown” bread is a term which is applied in a promiscuous way to all loaves other than white, whether they are made from the whole grain of the wheat or from meal from which a portion of the husk or the germ has been removed. As a rule the whiter the flour the poorer the loaf. The nutritious value of bread cannot be measured by its starch and protein alone, but by these constituents plus the mineral salts which are almost wholly found in the bran and the germ. The practical superiority of wholemeal bread lies in the fact that these salts are retained, and that the mechanical action of the husk on the intestines maintains their activity and a consequent healthy equilibrium. The wholemeal bread eater, unlike the consumer of white

bread, is therefore neither a victim to pills nor to purgative medicines, which are among the afflictions of life, that is usually shortened in consequence.

The public are supremely indifferent to the enormous importance of suitable bread—the whitest of which is supplemented by cakes, pastry, and puddings made with the same emasculated flour. The truth is either unknown or ignored. “Brown” bread is sometimes made by bakers from white flour mixed with bran as occasion demands to please the views of their customers.

It has often been pointed out that the finest white flour forms only 66 to 70 per cent. of the wheat grain, but that wholemeal forms over 95 per cent. The smaller quantity is owing to the removal of the husk and the germ, which contains fourteen times as much protein (gluten) and fat, and eight times as much phosphate of lime (bone-building material) and iron, as fine white flour. The value of wholemeal bread to the consumer lies in the fact that—

1. It contains more fat than white bread.
2. It enriches the blood by increasing the number of red corpuscles—a good index to vigour; and—
3. It ensures that mechanical action and regularity of the system, without which no one can maintain health.

I am, however, of opinion that the employment

of yeast or baking-powder is deleterious to digestion.

Bread made in the home is of double importance;—it is a superior and a much cheaper food. On one occasion a responsible baker made some loaves from a weighed quantity of wholemeal at the writer's request. To his surprise the bread, then sixpence a loaf, cost only threepence, plus yeast and fuel. When, later in the year, bread and wheat meal cost $2d.$ a pound—which it may do with wheat at $1\frac{1}{4}d.$ —the quantity required for a four-pound loaf cost $5\frac{1}{3}d.$ Thus, by home-baking in war time there was a saving of more than one-third of the money paid to the baker.

The crust of bread is of much greater value than the crumb. It is 50 per cent. richer and contains 80 per cent. of nutritious food. In baking white bread it is important that the flour should contain neither too much nor too little gluten. Gluten is the protein of the wheat, and corresponds to the casein of milk and cheese and the nutritious properties of the lean of meat. When the dough ferments it is expanded by the gas which is produced, and cells are formed in the process. The walls of these cells chiefly consist of the elastic gluten, which, when it is too small in quantity, are too thin to resist the pressure of the gas. The result is that they burst, and the collapse involves heavy

bread. If, on the other hand, the flour contains too much gluten, the cell walls become too thick, and by resisting the pressure of the gas do not expand sufficiently. In this case the cells are too small, and the bread becomes close and inferior in texture.

Among the most agreeable and highly soluble of all pure breads I find Winter's highly malted loaf. It is rich in gluten and long keeping.

Bread differs in composition considerably. The water present in a loaf may vary from nearly one-third to nearly one-half of its weight. Thus one brand provides the buyer with 62 per cent. of feeding matter while another provides only 52 or 53. The selection is, therefore, of enormous importance, for a loss of one-sixth to a family consuming 4 lb. a day means that in twelve months there is a loss equal to over seventy large loaves.

The housekeeper who makes her own bread should remember that the weight made from a given weight of flour depends upon—

1. The character of the flour, which absorbs more or less water.
2. The quantity of water used in making the dough.
3. The size of the loaf.
4. The shape of the loaf, whether it is a cottage or baked in a tin.

5. The temperature at which it is baked.

6. The length of time it is baking.

Milk.—Cows' milk is the most substantial of all fluid foods. It is slightly heavier than water, although water forms $87\frac{1}{2}$ per cent. of an average sample. In other words, 100 lb. of cows' milk (10 gallons) contains approximately $87\frac{1}{2}$ lb. of water, $3\frac{1}{2}$ lb. of fat, from which we make butter, $4\frac{3}{4}$ lb. of sugar, $3\frac{1}{2}$ lb. of the protein material, casein, which as a food resembles the albumin of egg and the gluten of bread, and nearly $\frac{3}{4}$ lb. of mineral salts. A man drinking twelve half-pint glasses of milk in twenty-four hours can well sustain life, although the solid food which this quantity would provide would weigh only 15 oz. Milk, however, is perfectly balanced, and it contains all the constituents necessary for the maintenance of the body. The fat of milk is present in the form of minute globules, which are regularly distributed, although they are irregular in size. Those in rich milk are larger than those in poor milk, and they have been estimated to number from one to three and three-quarter millions in a cubic millimetre.

When warm milk is poured into a shallow vessel standing in an apartment at 60° F. the fat rises to the surface and forms *cream*. It is this cream that is churned into butter. The milk from which it is removed is *skimmed milk*, but if it is removed

by mechanical means it is termed *separated milk*. This form of milk still contains the sugar, the casein, and the mineral salts, and is, therefore, one of the cheapest foods on the market, although it is usually given to pigs or to calves.

The nutritive value of milk, containing $3\frac{1}{2}$ per cent. of fat, may be placed at 300 units of heat or energy to the pint. As, however, the sugar of milk is fairly constant in quantity, and as it is the fat, and, to a smaller extent, the casein, which is materially increased in rich milk, the public should take the precaution to ensure both quality and purity, as a slight increase in the quality adds materially to its nutritive value. If milk resembling that just referred to costs 4*d.* a quart, it follows that a penny buys 150 units, but the same sum spent in skimmed milk at 6*d.* a gallon purchases 235. Buyers of milk should guard against artificial colouring and preserving with drugs. The milk food Sanogen is an excellent tonic when one is run down.

Condensed Milk.—This is a rich food for growing children and adults—being an excellent addition to puddings, fruit tarts, porridge, raw or stewed fruits, and sweet dishes of all kinds. Condensed milk is the milk of the cow deprived of a large proportion of its water. As it varies largely in quality—for in some brands a part of the cream

has been removed—it is important that a regular buyer should ascertain which is the best. A good sample contains 11 per cent. of fat, 8 per cent. of casein, and 65 per cent. of sugar, with 2 per cent. of mineral salts. Thus a 15 oz. tin contains 10 oz. of sugar—two-thirds of which consists of cane sugar. At 3*d.* a pound in normal times the sugar is worth 2*d.*, the fat at 18*d.* a pound 2*d.*, and the casein 1*d.*, or 5*d.* in all omitting the minerals. Skimmed condensed milk is also an economical food if we make allowance for the cost of the tin and the convenience. Pound tins of the past have been reduced to 13 oz., while the pre-war value of the sugar and casein is 2½*d.* To bring back this milk to its original condition a tin should be mixed with 30 oz., or 1½ pints of water.

Cream is a luxury, and, as with fats, excess is better avoided unless it is eaten with fruit and bread, or some equivalent food. In a half-pint of rich cream, weighing 10 oz., there are 6 oz., of pure butter-fat—over 3½ oz. of the remainder consisting of water. When, therefore, cream is eaten freely with fruit, the consumer is practically eating butter and water. In Devonshire clotted cream, as in poor raw cream, there is a slight increase of the casein of the milk. As a source of energy rich cream, costing 2*s.* a pint, provides 135 units for a penny.

Butter of average quality consists of 86 per

cent. or about $13\frac{3}{4}$ oz., of milk fat in the pound, and 14 per cent. of water. While a badly made sample may contain more water—in a perfectly made sample there may be as little as 12 per cent. A roll of fine butter should be tough, but not greasy, and when bent it should gradually fracture, thus showing the grain which resembles that of cast iron. If butter is heavily salted it is not only of less value as food, but the fine flavour for which it is eaten is neutralised to such an extent that the consumer might as well eat margarine. There is a wide difference in the flavour and colour of butter. That made in Denmark is produced in the creamery as in Ireland, and is consistently uniform, while that imported from France is made by the farmers of Normandy and Brittany, and graded and blended in factories. Flavour is partly due to the richness of the milk, and partly to the action of bacteria, which produce acidity in the cream. Butter should not be kept more than a week, and always stored in a dry place at a temperature of 40° to 50° F. It is an expensive form of fat, and is not essential as part of a diet, for its place can be taken without loss by margarine, dripping, lard, or fat bacon. The value of butter as a food, like that of all fats, lies in its great power to provide heat and energy. There is, however, a limit to fat eating, and that is placed, in the case of a strong, healthy man, doing

regular exercise, at $5\frac{1}{2}$ oz. a day. Few people, however, can take so much without upsetting the stomach. Butter is more easily digested and absorbed than the solid fats of mutton and beef, for the reason that it contains a larger proportion of the more fluid fats in its composition. It is for this reason, too, that oils and margarine made from oils are so useful. It is well that the public should know that a large portion of the butter they consume is made in Siberia and Argentina, and that whether it is manufactured under perfect conditions or not those conditions are practically unknown to the consumers of this country.

Cheese.—Hard, or pressed, cheese consists of the fat and the casein of milk in combination with about one-third of its weight of water. It is, therefore, a rich, concentrated food, although for that reason it is not so suitable for those engaged in sedentary occupations. Nor should it be eaten freely by those who consume meat, owing to its richness in the protein substance, casein. All the firm cheeses—Stilton, Gorgonzola, and Roquefort excepted—the last being made from sheep's milk—are of similar nutritive value, a penny buying about 200 units when they cost 9d. a pound. The three varieties of cheese named, which are permeated with blue mould, are less rich as foods, while they are unsuitable for all but the robust; and the wise

will avoid them, for the blue fungi, never desirable, is occasionally poisonous. The most useful type of cheese to the average consumer is made of white soft curd, and is usually sold in this country from spring until autumn, although it is common in France at all seasons. This cheese is made from new milk; it is not so concentrated, containing half its weight of water and half the quantity of casein present in firm cheese, like Cheddar and Cheshire. It is, therefore, more digestible than hard cheese, and twice as nourishing as meat—providing, as it does at 9*d.* a pound, 180 units for a penny. Butter should not be eaten *with* cheese, as it usually is at a liberal table, for one-third of the cheese consists of butter, and the mixture is not only extravagant but undesirable. Dutch cheese—the flat or Gouda being of better flavour than the Edam or round variety—is made from milk of only moderate quality. Gruyère, which is made in France and Switzerland, resembles Cheddar in flavour; but there are two varieties, one of which is made from skimmed milk. This is tough and lacks mellowness and flavour. Parmesan, which is made in Italy, and is produced largely from skimmed milk, is usually placed on the table after grating for sprinkling on soup and other dishes. The refined French cheeses—Brie, Camembert, and Coulommiers—are

all soft varieties, which are made from new milk, and all are piquant in flavour. They are, however, while delicious, expensive to buy, and less suitable than the English varieties to all who would live with economy.

Margarine is the most economical fat sold to the public for spreading on bread. Hitherto it has been subject to two forms of objection: the first, by the better educated, who would gladly hail a butter substitute if the word "butter" were retained to describe it; and the second, by the ignorant and the prejudiced, who believe, or profess to believe, that margarine is an inferior or unwholesome food. The refusal of many among the working-classes to eat wholemeal bread is quite in accordance with their rejection of margarine, although on all grounds but flavour it is equal to the best, and superior to inferior, butter. The energy, or food value of the two fats is precisely the same, so that while a pennyworth of a sixpenny sample of margarine buys 600 units, the same sum spent in butter at 16*d.* a pound, buys only 225 units. As food, therefore, butter at this price is two and a half times as dear as margarine.

Margarine, is a product of (1) animal fat, and (2) purely vegetable oils, and may now be regarded as a sound, nourishing food, and the most economical of all fats. It is a recognised fact that fats

with low melting points are absorbed by the system better than fats with high melting points. Margarine made of vegetable oils has a lower melting point than butter; and although I am not aware that any definite experiments have been made to test it, there is reason to believe that it is equally digestible. I have had the advantage of witnessing the process of manufacture of both forms of margarine, and I can testify to the absolute cleanliness which prevails in all the factories I have visited.

In making vegetable margarine 75 per cent. of coconut and palm-kernel oils are mixed with 25 per cent. of the oils of the cotton seed and the arachis seed—the popular earth, pea, or monkey nut. These oils are mixed, or emulsified, with skimmed milk, which, after pasteurisation, has been subjected to inoculation with a pure variety of lactic acid producing bacteria. The object is to convey that butter flavour to the margarine which is produced by churning similarly inoculated cream. This margarine, although such an excellent food, is not so perfect in flavour as that made from animal fat, or it would probably not be sold at 6*d.* (now 7*d.*) a pound, but it is superior to inferior butter. When, however, its flavour has been improved, and when it will keep firmer during hot weather, it will run butter hard among butter consumers.

Margarine made from animal fat is the product of those constituents of the fat of the bullock which have the lowest melting point, chiefly the olein—the stearin, which possesses the highest melting point, is employed in the manufacture of candles. Margarine does not turn rancid like badly made butter, as the material from which rancidity is derived does not exist in this form of fat. As, however, both forms of margarine are churned with milk in the process of manufacture, a small proportion of the casein remains in the fat, and as this decomposes the tendency to keep perfectly sweet is diminished.

Dripping was a common substitute for butter before the introduction of margarine. It is the most useful portion of the fat of animals, inasmuch as it has a lower melting point than that which remains on the joint after the process of cooking. Dripping appeals more distinctly to some people than lard, margarine or inferior butter, when it is the produce of a good joint of meat, owing to its savoury character. As it is practically free from water it has a greater feeding value than butter, and is one of the cheapest sources of fat for the table when its cost approaches sixpence a pound. Unfortunately, however, for those who prefer it, it is not easily obtainable.

THE FARINACEOUS FOODS

Wheat is not generally eaten in its whole condition, although there is no more delicious cereal than “*frumenty*,” a Lincolnshire dish, which is perhaps the most economical of all foods when made with skimmed or separated milk. Wheat contains all the materials required for the sustenance of the body, and even when prices are high it supplies them at smaller cost than either barley or oats. When the market price is 48s. a quarter of 50½ lb., a pound of wheat costs 1½*d.* per pound, or less than one half the cost of either of these cereals, which cannot be eaten in the husk. The fact, too, that wheat can be so eaten is another point in its favour, quite apart from its more popular character. In the cooking of *frumenty* the newest wheat obtainable should be cooked in the oven in either water or skimmed milk, just sufficient in quantity to render it perfectly soft and pulpy, when the grains have all burst. It is eaten with milk and sugar, with currants, or flavouring at will, and is a favourite dish with the children.

In 100 lb. of wheat there are 79 lb. of digestible nutritious matter, the balance being chiefly water and indigestible fibre. At the time of writing white flour costs, in round figures, 2¼*d.* a pound, or twice

the price of wheat at 48s. a quarter, while bread costs $2\frac{1}{2}d.$ a pound. White flour, however, forms only 65 to 70 per cent. of the wheat, so that while it has lost its most valuable properties it costs double the money. Like whole wheat bread, frumenty is a light food, for its composition prevents heaviness.

Rice.—There are various cereal preparations which consist chiefly of starch, and which are in consequence by no means desirable, for, while they are poor in protein (muscle formers) and fat the mineral substance has been taken away. Wheatmeal, oatmeal, semolina and the best preparations of maize, are all sufficiently rich in protein to supply the needs of the body, but the cheaper tapioca and maize flours are almost devoid of this essential constituent. Rice deprived of its husk is not only a little below the standard in protein, but it is poor in mineral salts. It is, however, one of the most economical of all foods, and the buyer should recognise that, although there are various qualities, the cheapest, if clean, is quite equal as food to the best. Where it can be obtained it should be bought in the husk, for in this state it possesses a superior value. Rice pudding is a justly popular dish for a family—6 oz. cooked with three pints of skimmed milk, with the addition of 2 oz. of margarine or suet, and sugar, providing a large plate of nourishing food for five people at a cost

of less than a penny apiece. Rice should not be boiled, as something is lost in the cooking, but baked in the oven. If it can be steamed and afterwards fried with butter, margarine, or oil it provides a good savoury dish, which may be flavoured with chopped onions, chervil, or curry, at very nominal cost. Rice should always be well cooked, and full allowance made for its swelling propensity. Although the ration might not be very convenient, for it would be necessary to add water for cooking, 1 lb. of rice with 3 pints of skimmed milk and 2 oz. of margarine with sugar would maintain a man in good health at the cost of 7*d.* a day. One pound of steamed rice with sugar and $\frac{1}{2}$ lb. of bread and 4 oz. of margarine would provide still more nutriment at a cost of 5 $\frac{1}{2}$ *d.*

Oats and Oatmeal.—The oat is the best-balanced food of all the cereals. It is rich in fat, protein, starch and the minerals, and is well adapted to sustain healthy condition. It is the best concentrated food for the horse, whether for heavy draught purposes or for speed. It is also the best dry food for calves and the feeding of poultry. Although this testimony to its value does not of necessity prove that oats or oatmeal are equally useful to man, who may not absorb their nutritious portions so well, it cannot be dismissed. The rolled oat, like the best coarse oatmeal, is of great

value in promoting the activity of the intestines, owing to the influence of the fibre, and this adds to its health-giving properties. The best form of food produced from the oat is the coarse Scotch milled, while the Scottish method of cooking should always be followed. Porridge in England is not only too thin, and therefore too little substantial, but it is much overcooked. The assumption that long cooking makes oatmeal more digestible is not altogether correct, inasmuch as in this condition it is swallowed without sufficient mastication, and often gives trouble in consequence. Coarse Scotch meal, cooked in the Scottish way, *must* be masticated, with the result that it is well mixed with saliva, which promotes perfect digestion. There is, however, a loss of energy in the process of cooking; and, in spite of the supposition that cooking is so essential, I find no difficulty in digesting rolled oats simply soaked in cold water for twelve hours, and mixing them with crushed or grated fruit—thus making fruit porridge, perhaps the most perfect of all additions to a regular diet, if I may judge by the high standard of health which it assists to maintain. Oat flour, fine oatmeal, as used for gruel, and groats, are all inferior to rolled oats and the coarse oatmeal, containing, as they do, less fat, protein and minerals—the three most important constituents of the grain.

Oat, or girdle, cake is one of the most useful, nourishing and concentrated of all cereal foods, but its price at the bakers is out of all proportion to its cost to produce. A thin, dry, oatcake weighing 3 oz. is quite equal as food to 5 or 6 oz. of bread, and can be carried with much less inconvenience. There is no food better adapted for a man engaged in hard physical labour as a snack between meals. The value of good oatmeal porridge may be estimated from the following figures. Two ounces of coarse meal may be cooked in just sufficient water to make it almost as stiff as a jelly. The addition of half a pint of skimmed milk, a large pat of butter or margarine, and sugar to sweeten it, will provide a substantial plateful of porridge at a cost of $1\frac{1}{2}d.$ The energy value of this food would be equivalent to 400 calories. The employment of new milk instead of the skimmed milk and butter would increase the cost to $2d.$, but it would not materially increase its nourishing properties.

Barley is not largely consumed as a food, although it is one of the most nourishing cereals. It is probable that the reason is to be found in the high price at which it is charged. Malting samples apart, barley, weight for weight, is cheaper than wheat, but it contains more fibrous matter in the husk, and consequently less nutritive food.

Where, however, this fibre is removed it is of similar value, although its cost is out of proportion to that value. When a bushel of barley weighing 50 lb. can be purchased in normal times for 3s. 6d. to 4s., or less than a penny a pound, the mere removal of the husk unwarrantably increases it to 2½d. and 3d. While barley contains the smallest proportion of fat of all the cereals, and is relatively poor in protein for the formation of muscular tissue, it is the richest in mineral matter. Samples vary, however—a fact which the grower learns to his cost when he offers a poor sample to a brewer—for a really thin barley contains but two-thirds of the normal quantity of starch. Barley will not make edible bread, in consequence of its small proportion of gluten, but its flour is frequently used in Wales for this purpose when it is mixed with wheat flour. Barley was, however, largely used in this country by the rural population of the past as a breadstuff in spite of its inferiority.

Barley water, which is frequently recommended as a nourishing drink, has really nothing to recommend it in this direction, for its feeding property is but infinitesimal.

Tapioca is the product of the cassava plant, a native of the American tropics, which it has been claimed produces six times as much feeding substance to the acre as wheat. It is rich in starch,

but the real article is imitated by a product of the potato, which is almost pure starch. It is advisable, therefore, in preparing cheap tapioca to use milk and eggs, that its deficiency in protein may be properly modified.

Macaroni, Spaghetti, Vermicelli.—These foods, so popular in Italy, are of great nourishing value, but that value is diminished by the fact that they are made from very fine flour which leaves no residue in the process of digestion. They should, therefore, be eaten with fruits or tomatoes in their skins, or with green vegetables. Like all cereals these foods absorb a large quantity of water in the process of cooking. The starch present in an average sample reaches 12 oz. in a pound, and the protein $1\frac{1}{2}$ to 2 oz., but the proportion of fat is so small that oil, butter, or margarine should be added where macaroni forms a large item in the diet. Macaroni cheese, as prepared in England, is a less digestible dish than where grated cheese is sprinkled over it as in Italy. In making a pudding from either of these foods with the assistance of new milk, 6 oz. should be broken small in a dish of three pints, with sugar, and flavour to taste. This will produce five large plates, weighing about 10 oz. each, at a cost of $7\frac{1}{2}d.$, when the paste costs $4d.$ a pound—or, where skimmed milk can be obtained at a penny a pint, and 2 oz. of

margarine are added, $5\frac{1}{2}d.$ —*i. e.* a fraction more than a penny a plate.

PREPARATIONS OF MAIZE.—If we omit the preparations of maize which are sold in this country for making moulds or blanc-mange, this most valuable cereal is almost ignored, although it is quite equal to wheat as a producer of energy, containing as it does more fat and starch and an ample proportion of protein. Maize forms one of the most popular foods in Africa, in America, where I have enjoyed the corncakes common to the country; and in Italy, where polenta is the chief food of the peasantry, while it is widely consumed in Ireland. It is one of the most economical of all foods—a well-made meal providing sweet or savoury and highly nourishing cakes for the dinner or the tea table, and for this purpose, too, hominy may be used. At $2d.$ a pound a penny buys 800 units, but the maize flours which are practically all starch—there being barely a trace of protein or mineral salts—provide a great deal less for the money. Maize products are not only well digested, but well absorbed, and, for the reasons advanced, combined with their lower price, it is a pity that they are not more largely consumed.

DRIED PULSES—BEANS, PEAS AND LENTILS

The popular pulses are the cheapest sources of protein, and among the most economical sources

of food when the cost does not exceed $2\frac{1}{2}d.$ to $3d.$ a pound. Their extreme richness, however, is greatly modified by the large quantities of water they absorb in the process of cooking. These foods contain from one-fifth to one-fourth their weight in protein, with more than one-half their weight of starch, some fat and mineral salts. It has been said that in spite of the richness of the pulses in protein a large quantity must be eaten to obtain it, and that they may, therefore, be eaten with meat. There is, however, no food so well adapted to replace meat, while to mix the two foods is to increase the protein beyond what nature requires, and to incite in the middle-aged those troubles to which so many are subject. Assuming that all the nutritive matter in haricot beans is absorbed, although it is well known that it is not, 10 oz. would provide all the protein that an average man requires, without trespassing upon another kind of food. It would, however, be necessary for him to consume nearly 2 lb., with 2 oz. of fat, in order to maintain him at physical work. If it became necessary to consume a sufficient quantity of haricot beans, to provide the large proportion of protein which old-fashioned teaching insists is required, a man would need 21 oz., which it would be impossible for him to consume.

Pulses are slowly digested. Dried green peas

are becoming as popular as haricot beans, but they need equally careful soaking, and the addition of carbonate of soda which some vendors provide with the peas to reduce them to edible softness. It may be added that in using lentil flour for porridge 2 oz. is sufficient to make a good plateful. Although it is sometimes assumed that the non-meat-eater must of necessity eat pulse with regularity for the sake of its protein, this is not really the case, and, substantial as they are, neither dried peas, beans, nor lentils should be eaten too often, but used as a change.

ANIMAL FOODS

Eggs.—There is no greater mistake than the popular belief in the great nourishing value of eggs. Although most useful as food and in the preparation of various dishes, the egg is a luxury, or, to put it in another way, it is one of the most uneconomical of all ordinary foods, owing to its cost. An average egg weighs two ounces, and costs twopence during a great portion of the year, or one penny per ounce. Such an egg is able to produce 80 units of energy, or 40 for a penny. A pint of new milk, however, costing twopence, is equal to 300 units, or 150 for a penny, so that as a food milk is more than three times the value of eggs when these prices prevail. When, however,

an egg costs a penny it is still nearly twice as costly as milk, and eight times as costly as oatmeal or bread.

In a new-laid egg weighing 2 oz. there are over $1\frac{1}{2}$ oz. of water and shell, so that the actual food material weighs less than half an ounce, and when eggs are 2*d.* each this costs over 4*d.* an ounce. Compared with this the food in milk, costing 2*d.* a pint in normal times, costs less than 1*d.* an ounce; in rice and bread at 2*d.* a pound, and in potatoes at $\frac{3}{4}$ *d.* a pound, it costs less than a farthing an ounce, while in meat of medium fatness costing 10*d.* a pound, it costs about $1\frac{1}{2}$ *d.* an ounce. On all grounds, then, eggs, popular and useful as they are, are an extravagant food.

The white of egg contains seven-eighths of its weight of water, while water forms one-half of the weight of the yolk. The chief fats of the yolk are identical with the chief fats which form butter, and they are easily digested and assimilated. The yolk is rich in the invaluable phosphate of lime—the great bone-making material—but iron is also present in marked quantity, and for this reason the yolk of egg is of more value than the white. The yolk, too, is moderately rich in protein (albumen), which forms the only feeding substance in the white, if we except the minerals. Eggs are useful for children when mixed with skimmed milk

and a cereal for making puddings and dishes which are otherwise poor in protein and fat. It is, however, a curious custom which associates them with bacon and ham, inasmuch as they are rich in the two materials in which these meats are richer still. Eggs leave no residue in the system; they are more easily digested when raw or lightly cooked than when fried, boiled hard, or made into omelettes. They preserve admirably in water glass at very small cost.

Meat.—It has often been remarked that we British are a meat-eating people, and that owing to our position on the globe, our predisposition to eat animal food is a natural one, and indicative of the fact that we need it. I can discover no evidence to warrant this belief, but I do remember that in my boyhood the labouring classes ate no other meat than they obtained from their pig, and that this was chiefly very fat bacon. Nor are farm labourers, navvies, and other manual workers great meat-eaters now. I often observe that these men subsist mainly upon bread-and-cheese and fat bacon, which is much more economical as a producer of energy than mutton or beef. Thus, while a cheap joint of boneless fresh meat provides 100 units of energy for a penny, when costing 8*d.* a pound, fat bacon costing 10*d.* a pound provides double as many. It has been frequently asserted that fresh

meat is essential for building the bony structure and muscular system of the young, as well as for maintaining both in the adult. Some conspicuous writers, however, draw the line at middle age, suggesting that meat is a dangerous food for regular consumption where the system no longer needs the large proportion of protein which it provides either for construction or repair. The reason given is a serious one, inasmuch as it makes demands upon the vital organs with which they are less able to comply; and as age increases, the pressure becomes too great for them to bear, and one or more breaks down.

Lean meat is one of the most easily digested of the foods which are consumed by man, but its value is much exaggerated. Fat meat is more economical than lean meat. With the increase in the proportion of fat there is a corresponding decrease in the proportion of water. In a pound of the lean of beef the water and waste weighs from 12 oz. to $12\frac{1}{2}$ oz., and in a pound of fat beef the actual food material weighs only 8 oz. to 9 oz., according to the degree of fatness. In fat meat, however, the fat forms nearly two-thirds of the whole of the nutritive matter. Thus, a pound of very fat meat without bone, costing $15d.$ a pound, will provide about 6 oz. of lean and nearly 9 oz. of fat, which is as high-priced as

butter, but of no greater value as food than dripping or margarine costing 6*d.* a pound. That portion of the fat which drips from the joint in the process of roasting becomes dripping and is valued accordingly.

Where a joint of meat contains bone, gristle and tendon, which the consumer rejects, the waste from these sources may reach 20 per cent., or one-fifth of its weight. If, however, a joint bought at a shilling a pound, costing 6*s.*, contains 15 per cent. of waste, it is reduced in round numbers to 5 lb., so that the actual cost before cooking is nearly 1*s.* 2½*d.* a pound. This, combined with the fact that the lean or muscular portion contains nearly three parts of its weight of water; that it is an imperfect food, and that the fat costs double its value in money, constitutes meat the most expensive of all those popular foods which are placed on our tables. When this truth is fully understood; when it is realised that meat is neither essential to health nor to strength, but much less nutritious than the cereals and the pulses and their various preparations, and that meat accounts for many of the ailments of those who are growing in years and is a bar to longevity, we shall reduce our consumption, and as a natural consequence live with greater economy and live better and longer.

While I very occasionally eat meat in some form

—either fish, flesh, or fowl—when dining from home, I am conscious that since I abandoned all as a part of my regular diet the joy of life has been renewed, health and strength and mental power have been improved in a marvellous way, with the result that, in spite of increasing age, feats of mental and physical exercise impossible in earlier days have been, and are being, accomplished. What has happened to me has happened to many. This has been done upon approximately one-half the quantity of protein—the muscle-producing constituent of food—that a man is supposed to require in accordance with the erroneous teaching of the past.

On an ordinary mixed diet, including meat once a day only, average men consume this full allowance of protein, with the result that in four or five out of six it produces uric acid to such an extent that rheumatism, gout, kidney trouble, or another of the many diseases which are caused by this poison, is established, and the patient either dies or lives a protracted and painful existence.

We have seen that the cheapest meat is the fattest, so long as it is a rational joint, for while the lean containing the protein is marbled with fat, and is thus richer than the muscular portion alone, it makes up by its improved quality for its reduced quantity, the fat being practically an addition. While it is impossible to eat fat with

impunity, as nature would quickly rebel, it should be recognised that it is equally impossible to eat lean with impunity, without permanent harm. This, however, with most men is a regular practice, because in this case nature is slower to express her opinion. Lean meat is a stimulant, hence the system is to some extent gratified by its consumption, and to the misfortune of man he knows nothing about it until trouble arrives.

If meat eaten once daily may, as it so frequently does, cause damage to health, what can we say to those to whom meat in its various forms is the Alpha and Omega of existence. The morning commences in homes in which I have stayed with meat in variety—bacon, kidneys, sausages, chops, brawn, eggs and cold chicken and ham. With luncheon comes fish and flesh; while at dinner soup with a meat foundation is succeeded by fish, *entrée*, joint and game, or poultry. How is it possible that a man, whose organisation is constructed to deal with 100 gm. of protein at the outside when he is no longer a physical worker, or when his muscular system no longer requires, or is able to deal with, more than 60 gm., can consume 250 to 300 gm. without serious bodily harm? He does not, however, for in most cases such a man dies a premature death, and having broken nature's laws he perhaps takes with him knowledge of great value to the

race, and is lamented as a victim to one of those forms of disease which God is said to visit on man, but which man brings upon himself.

That portion of meat which acts as a stimulant is the extract which is the chief source of its flavour. Thus, there is a marked difference in the appetising value of roast as compared with boiled meat, which has lost a portion of its extract in the process of cooking. Meat extract, however, possesses practically no nourishing value. Young meat provides a smaller quantity of extract than mature meat. Thus, if the rich fat of roast lamb were removed from the joint the lean would prove insipid and much less inviting. Boiling, however, also removes a portion of the fat and the mineral matter in the flesh, while the loss of weight in a boiled joint may reach one-fifth of the total. Cooked meat, therefore, weighs less than raw meat—a fact which the buyer of cooked ham or beef is able to realise from the enhanced cost. If, however, boiling is followed by a loss of fat, that loss is increased by roasting.

Although cooked mutton and beef are well digested and absorbed, raw minced meat is digested more easily, and meat which is underdone is digested more easily than that which is well done. While, however, fresh pork is regarded as difficult of digestion, cured bacon is perhaps the most easily digested of all meats, including the fat.

The most innutritious and undesirable of all flesh foods are the offals—liver, heart and kidneys—while calves'-head, sweetbreads and brains, much to the surprise of those who believe in their great utility for delicate persons, are quite the reverse. Calves'-head is one of the poorest of animal foods, providing only one-twelfth of its weight of nutritious material. The larger, or pancreas sweetbread, a much richer food, is one of the most prolific sources of uric acid, although on account of its high digestibility it is a favourite dish among those suffering from the diseases which it assists in producing. Brains, although easily digested, are so imperfectly absorbed that they provide approximately only one-tenth of their weight of nourishment. With the exception of the heart, the chief organs of the body contain but a small proportion of fat, their flesh being indigestible and unsuitable as a nourishing food for all but the hardy and strong.

Poultry, Game and Rabbits may be valued from the same point of view as meat—they are animal food. The fact that they constitute white meat makes no actual difference to their nourishing value. Their digestibility depends upon their youth and condition—very fat fowls, and in particular waterfowl, being much less digestible than birds in normal condition.

Bacon, although one of the most popular of all

foods in this country, requires short notice at our hands. Usually eaten much fatter than fresh meat, when it is boiled it is of greater value to those whose occupation requires them to eat plenty of digestible fat, especially during the winter season. Bacon is easily digested, and when the lean portion of the meat does not exceed 25 per cent. it is, cooked in this way, an economical food at all times when prices are normal. When, however, bacon is dear it is more costly than butter, and one of the most expensive of animal foods, especially if it is fried, owing partly to the loss which is sustained in the process of cooking—a loss which few well-to-do persons take the trouble to prevent by saving the dripping. When bacon is fried or toasted until it is dry, it costs double as much as is paid for it, two rashers being required to provide the same weight as one as it came from the hands of the tradesman.

The best parts of the side are the cheapest, the lower-priced fore-end containing a large proportion of bone and coarse meat. Labourers and other country people who feed their own pigs are able to provide bacon for their own consumption at much lower cost than is charged by the grocer. In the course of its production and sale bacon passes through the hands of the curer, the merchant, and the retailer, and in each case a profit is made.

The best class of bacon is produced by pigs fed upon barley-meal, potatoes and skimmed milk—a typical pig weighing 175 lb. when he is slaughtered. This weight is reduced to 130 lb. or thereabouts, in the carcase, and 112 lb. when the cured sides are ready for sale. This weight provides typical sides of sizeable meat weighing 56 lb. each. The best joint of bacon is the loin, which should be composed of a rich, firm, tender fillet of lean, covered with two inches of fat. This depth of fat, however, which is more than the public demand, although it means more economical bacon, is not often produced on pigs of this size, but on those which are larger. The belly, or streaky, takes the next place, followed by the gammon or ham. Bacon is now usually cured with the assistance of boracic acid, which is better avoided, but the fact is not generally known. There are some factories, however, in which no boracic acid is used.

FISH.—If we base the value of fish upon its average price we cannot regard it as an economical food. When herrings, sprats, mackerel, plaice and cod are exceptionally abundant and sold at low prices the question bears a different aspect. With the exception of herrings, eels, salmon and brill almost all varieties of fish contain little nutriment—water, bone and skin forming 75 to 85 per cent. of their weight after boiling. The fat fish—eels,

salmon and herrings—are much the most nourishing, although, owing to their fatness, they are less well digested than white fish which are almost fatless, but which are among the most popular. These include smelts, plaice, soles, lemon soles and whiting—all of which contain a large amount of water, bone and skin—and halibut, hake and cod, in which waste is less. Among those varieties of fish in which the proportion of bone and skin is most prominent are turbot, gurnet and haddock.

In the whole range of fish consumed in this country herrings hold the first economical place—haddock, hake and whiting, all popular among the working-classes, being relatively dear, owing to their extreme poverty as food. Nor are the flat fish—soles, lemon soles and plaice—much superior. Thus, as food for families with small incomes, putting herrings aside, and with the reservation already made as to low prices when fish is abundant, fish cannot be recommended except as an agreeable or occasional addition to the foods of the table.

The nutrient matter of fish is easily absorbed, but, except in relation to the latter varieties—salmon, herrings and eels—fish contains nothing but the muscle-building material—protein—with some useful mineral matter. It has been observed that a man cannot perform severe physical work upon white fish of the popular varieties. Perhaps this

is explained by the fact that, unlike red meat, it is not a stimulant, and that, weight for weight, as compared with an average joint providing some fat, it is much less nutritious. There are times, owing to the variation in the prices of fish, when the more costly salmon, or brill, is more economical to buy than haddock, whiting, or hake. Thus, salmon at 2*s.* a pound provides 5 oz. of nutritious food at a cost of about 5*d.* an ounce, whereas a pound of whiting or lemon sole provides only 2½ oz. of food, and that of a less valuable character, at a similar cost. When soles cost 2*s.* a pound each ounce of nutriment—almost entirely muscle-forming—costs 10*d.* in round numbers. Fish is not only much too costly to be regarded as a daily food, but it is a producer of uric acid, and should, therefore, be eaten sparingly, if at all, by elderly people.

CHAPTER VII

THE ADVANTAGES OF AN INCREASED VEGETABLE DIET

THE average medical man is an advocate of a mixed diet. In my experience he advises his patients to eat one-fourth of what he consumes as animal food. The vegetarian, on the contrary, declines flesh altogether, and he has some excellent reasons, although he goes a little too far as an advocate of the system he follows. Man, however, who can eat what he likes, declines both of these courses, and makes flesh in some form his Alpha and Omega at each of the three real meals of the day.

A vegetarian is apparently one who abstains from all animal food, with the exception of eggs and milk and its products. As the need for economy has given great encouragement to abstention from meat on account of its price, this system of feeding the body has obtained greater prominence than ever before, and it is quite probable that the advantage which many derive from it will largely expand the ranks of vegetarians.

It may be well to examine the claims of vegeta-

rians and of meat-eaters respectively, and, as I have had an almost unique experience, I take up the task.

The vegetarian asserts that flesh-eating is not only injurious to the body, but to the mind, and therefore to the supreme happiness of man; and that, on the contrary, vegetable food contributes to both moral and physical health and long life.

That meat is a costly, extravagant, unnecessary, and an unscriptural food.

That flesh-eating is more deadly than alcohol-drinking, inasmuch as it is the direct, or indirect, cause of some of the most dangerous of organic and other diseases.

Now let us see what the meat-eater says, although it is next to impossible to find any organised claims for his favourite dishes, for he makes them the chief food of his life.

He tells us that flesh is essential for the manufacture of muscle, and thus for the provision of strength; that it is not injurious to health; and that without it man is not properly fed.

That the protein in animal food which is employed in the construction of the muscular system is better absorbed, and a greater conserver of energy, than the protein of plants.

That a vegetable feeder must consume a much larger quantity of food than his system is con-

structed to deal with without disagreeable results, and that he is less energetic and less able to withstand disease.

I believe these claims fully represent the views of the man who is able to defend the system he follows. It is, however, certainly true that, unlike vegetarians—some of whom go to the other extreme, and, as I discover, make some unhappy mistakes—the average meat-eater has not studied either the scientific or the practical side of the subject. He holds his position as a matter of course, and his system as granted. Flesh-eating is part of his nature, his everyday life; and he regards those who dispute its appropriate character as cranks.

This is not the right attitude from which to discuss a serious subject. The meat-eater should face the question with courage, for, if he is wrong, his health and his happiness—indeed, his whole life—may depend upon that. Is meat-eating injurious? Meat—*i. e.* the muscular tissue of fish, flesh, or fowl, is an abundant producer of uric acid, the prime cause of many serious bodily troubles. That fact is never disputed, although poor, suffering men are seldom advised to abandon the food of its origin.

Consistent meat-eating, which materially differs from the practice of the moderate man, means

the consumption of two, three, or even four times as much muscle producer as the body requires, but not one in ten thousand understands or believes it. The virtue of meat is supposed to exist in its power to build up the body. The adult system of man simply demands protein for the repair of his muscular tissue, not its construction, and for this purpose he can obtain all he requires from the cereals, pulses, vegetables, and fruits, with bread, eggs, milk, and cheese, if he chooses to eat them. Thus, meat is more than superfluous, for it puts extra pressure on the heart and the organs of digestion and secretion. The result is the frequent collapse of one or more of these vital parts of our human machinery.

I am informed by one of the foremost of European authorities—whose experience extends to thousands of cases—that meat-eating is accompanied by the flourishing life and activity of specific intestinal bacteria, which are engaged in the constant production of matter of a poisonous character. This product, if borne with equanimity by youth and vigorous manhood, is a special danger to middle-aged men. When meat is abandoned in favour of a non-animal diet, in which fruit plays a prominent part, the germs are expelled, and the trouble rapidly ceases, for the food is no longer appropriate to their active existence.

Meat is a stimulant, acting as all stimulants do, depressing the muscular system, arousing the animal passions, and creating a thirst for alcohol, coffee, and tea, all of which contain toxic materials, which are unknown to the non-animal feeder.

A vital feature in the composition of food is its mineral matter. If this is deficient—as it is in meat and white bread—the blood, and therefore vitality and brain power, suffers. Where food consists solely of bread, cereals, pulse, vegetables, and fruits without removing the skins, the red corpuscles of the blood are largely increased, and the devitalised invalid becomes a vigorous man, and pills and potions are no longer required.

I have arrived at these conclusions by practice and investigation, and I can confirm them in the light of the medical explanation of facts. Health, happiness, mental and physical vigour, sleep, and a calm confidence in a glorious future—all are the result of the almost entire abandonment of flesh-eating.

Now let us examine the claims of those vegetable foods which the meat-eater objects to consume to the exclusion of meat, but on which the vegetarian lives a longer and happier life.

Man requires for the maintenance of his health and vigour food material in four forms—(1) the muscle builder (protein), (2) the heat and energy

producers, chiefly starch and sugar (known as carbohydrates), (3) fat or oil; and (4) the mineral salts, which are so largely responsible for the enrichment of the blood and the construction of the bones and the teeth.

Flesh, by which I here mean the red meat, or muscular tissue, of beef, mutton, and pork—the white meat of poultry and game—and the red and white meat of fish—provides the muscle-builder almost alone, with its insufficient proportion of minerals. Man, therefore, could not live a normal life upon meat without additional food, nor is his organism constructed to deal with it. Apart from this fact, the quantity of flesh which he would be compelled to consume to exist at all would be so large and so expensive that he would ultimately fail in his task.

The foods of the vegetable kingdom furnish all the materials which are required for nutrition—muscle-builders, heat and energy producers, fat and oil, and the minerals in abundance—these being of the highest importance, although they are consumed in quantities which are very minute.

The protein in vegetables is assumed to be less well absorbed by the blood than the protein of flesh, and to provide us with a less concentrated muscle-building diet. It is also assumed that as this form of protein exists in such small quantities,

except in the pulses, man is compelled to eat a greater bulk of food in order to obtain all he requires. Lastly, the meat-eater insists that the quantity of this muscle-builder which man does require is much greater than the vegetable-eater has proved it to be, if we may judge by results, and on this point I am able to support the vegetable-feeder from actual experience.

Animal protein is a greater producer of uric acid than vegetable protein, and a known cause of disease—a fact which cannot be charged to the account of the latter. If vegetarians, and others like myself who have passed through the ordeal of long experiment, can maintain high condition upon the small amount of protein which vegetables eaten in moderate quantities provide, with the assistance of milk and its products, it is apparent that in spite of its less perfect absorption the claims of the meat-eater are in opposition to facts.

Although there is still much to learn on the subject of the nutrition of man, it is essential to refer to another claim that is made as between the two schools. It has been pointed out that the large proportion of fibre in vegetable foods—always excepting those from which it has been removed, such as rice, white flour, and macaroni—interferes with perfect digestion by inciting the intestines, stimulating peristalsis, and hurrying their contents

so rapidly through the system that opportunity is not given for perfect absorption. It is also suggested that owing to the larger mass of food consumed by vegetarians it is not mixed with the digestive juices with sufficient freedom to ensure perfect digestion. These statements, which are not entirely without foundation, undoubtedly apply to those who are too careless to masticate their food thoroughly, or who, owing to bad teeth, are unable to do so; but they cannot and do not apply to the rational man.

It has been said, too, that the teeth of man are adapted to the mastication of meat rather than the mastication of vegetables, and that it is necessary in consequence to cook most of the foods we consume. This raises a question of the highest importance. If in His goodness the Creator has provided vegetable foods for our sustenance, He has not done so on the assumption that we should reject what in our wisdom we regard as unnecessary. The fibrous matter, or husk, of the wheat grain is more essential to health than the fibre of flesh. Its action on the organs of digestion is one of the most important in the maintenance of health, while the mineral matter it contains is more or less vital to life. White flour is a product of ultra-civilisation and extravagant living, and until recent years it was not only unknown to our own

working people, but to the inhabitants of all European countries, most of whom up to this day consume bread made from the whole grain. In cooking food made from finely ground flour, which has been deprived of its husk with the object of rendering it more digestible, we sometimes lose sight of the fact that we are ignoring the use of our teeth, with the result that assimilation is impeded rather than improved. This is essentially noticeable in the case of oatmeal porridge and other semi-liquid dishes, soft pulse, and cereal foods. As there is nothing to chew, the food is not retained in the mouth for admixture with the saliva, but swallowed at once. The saliva plays an important part in the work of digestion—preparing the food for the stomach, and thus causing less irritation to its walls, and at the same time assisting in the conversion of starch into sugar. If the teeth were employed more freely, and for a greater length of time, in the process of mastication, we should hear very few complaints of the imperfect absorption of the muscle-building constituents of vegetable foods.

If it is true that man is not a carnivorous animal, and that health and muscular fitness can be maintained, and greater longevity ensured by a vegetable diet, or a diet in which flesh plays a very unimportant part, it must be clear that it is not

only unnecessary but extravagant, apart from the fact that it is wholly or partly responsible for some of the most painful and dangerous diseases which are troublesome to man. This remark is not made without full and careful consideration of the fact that, with many another, we have enjoyed that mental alertness, physical health, and happiness, which were long denied while we were addicted to the daily consumption of meat. What has been accomplished by athletes who are rigid vegetarians, by the Japanese and the Sikhs, is described in another chapter. The facts, however, are unknown to the million, who apparently believe that flesh is an essential to life. On the contrary, there are numerous Eastern races, possibly numbering half the inhabitants of the globe, who live solely upon cereals, fruits, and other vegetable foods.

As already observed, one of the functions of food is the provision of heat and energy. That function cannot be established and maintained by flesh alone, however freely fat may be eaten, for there is a limitation to the quantity of fat which man can consume. The natural and most abundant fuel-food supplied to man is starch—hence his large consumption of bread. When wheat is sold at a normal price, as when bread is sixpence a loaf, a pound of fuel in the form of

starch can be purchased for $1\frac{1}{2}d.$, but when a lean beefsteak costs a shilling a pound, a pound of fuel in that form costs 4s.

It is not denied that the starch and sugar and fats and oils of vegetable foods are well absorbed, for the fact is well known; but it is reasonable to suppose that all the husk of grain and pulse, and the fibrous matter of vegetables, can no more be absorbed than the indigestible fibre of meat. The younger it is the more easily it is masticated and brought into condition for assimilation—hence young carrots, turnips, parsnips, and cabbage are chosen by those able to buy them, while those who produce these foods for the popular market prefer size to quality. The cellulose, or fibrous walls of the cells of plants, increases in toughness and indigestibility with age; and, therefore, an old carrot or turnip, while presenting more bulk, also presents more difficulty in assimilation and proportionately less nutritive matter.

Bread and other cereal foods, whether made from fine flour or wholemeal, should be well chewed, inasmuch as the starch is assisted in its conversion into sugar in the mouth, while the fibre is more easily enabled to part with the nutritive matter it contains. Starch is insoluble, but when it is converted into sugar—a soluble material—it is able to enter the blood. The oils, too, of vege-

table foods are more easily assimilated than the fats of animal foods, owing to their greater fluidity. Thus, olive oil is of greater value than suet, which contains a large proportion of stearin, a material with a high melting point, which is removed in the conversion of animal fat into margarine.

One of the arguments in opposition to the extensive employment of vegetable foods relates to their bulk, which, owing to the large proportion of water they contain, is undeniable. It is apparently unknown to those who adopt it, as it is known to us from practical experience, that the consumer of vegetables and fruits drinks very much less than the meat-eater, for thirst is practically unknown. It, therefore, amounts to this, that in one case water is consumed in combination with food, while in the other it is consumed in addition to food. This fact is of great importance to many persons who, with growing years, find that liquid disagrees with them, especially at the two great meals of the day. It is, however, now possible to live upon a vegetable diet in a much more concentrated form. Vegetables in great variety are dried, ground into powder, and placed on the market, although at the moment of writing the whole production is sold to the Government for the use of the Army and Navy. Much, however, can be done to reduce the bulk of vegetables

in the process of cooking, if steaming, baking, and roasting is allowed, as far as possible, to replace the wasteful process of boiling, and of removing the skins.

One of our national misfortunes is that the present generation has been trained to consume foods from which the husk or fibre has been wholly or partially removed. Wheat, maize, oats, rice, peas, potatoes, apples, stone and other fruits, all have suffered in value by this increasing habit, with the result that an attempt to eat these foods as they are grown is followed by complaints of discomfort and indigestion. The objections of mature people are reflected on the young who refuse to eat what they claim disagrees with their elders and what is disagreeable to themselves. The incorrigibility of the young, and the apparent impossibility of inducing them to adopt habits which conduce to their lifelong benefit, make it all the more incumbent on parents and others to show them a good example.

We have abused the foods, which have been so freely given to us, to such an extent that the mechanism of our digestive organs has apparently lost the power to deal with them; and this is not surprising when we contrast modern white flour with wholemeal, and when we remember the frequent complaints of people who cannot eat food

rich in starch, which is the characteristic and chief constituent of all popular and necessary diets.

Without abundant vegetable foods—and bread is the fairest example—man cannot obtain the requisite fuel for the production of heat and energy. The Salisbury diet of meat is indeed supplemented by bread for this purpose, and even then it is said to have killed as many as it has cured.

It is claimed that flesh is a healthy stimulant, and that on this account it performs a function which is foreign to the protein of vegetables. Stimulation, however, is not energy. We may suppose that there are few, if any, more energetic people in the world than the Japanese and the Arabs. One fact, however, appears to be abundantly proved, that the non-flesh-eater not only suffers much less from disease, but that he resists it more easily. There is one practice which most people decline—we refer to the taking of regular exercises. This the vegetarian is compelled to adopt in order to maintain bodily equilibrium and possible distension of the stomach. It is well that he does so; and it would be still better for the flesh-eater who by the regular adoption of the one course, and the failure to recognise the other, is often in trouble, finally succumbing to a course of procedure which his system was unable to maintain.

CHAPTER VIII

VEGETABLES AS FOOD

THE pressure which the war has brought to bear upon our purses, owing to the increased cost of food, has induced many persons, including ourselves, to put equal pressure on their gardens, and to consume a much larger quantity of vegetables than they have ever been accustomed to eat. So easy is it to reduce the butcher's, fishmonger's, and provision merchant's bills, with the assistance of vegetables, that the subject is worthy of the study of those who have hitherto ignored it.

By a judicious selection of vegetables, and a really careful system of cooking, delightful meals can be prepared direct from the garden. The enjoyment of eating, which is common to the healthy appetite, depends to a large extent upon the flavour of foods. That flavour is chiefly contributed by plants. Meat and poultry, for example, are always more appetising when accompanied by vegetables and savoury sauces. Pork, duck, and goose are eaten with herb-stuffing or apple-sauce or with both, while the popular sausage would be

a very poor thing without the flavour of the herbs within it.

Ingenious cooks are able to prepare dishes of vegetables which, skilfully flavoured, are as savoury and appetising as meat, and this is done with the assistance of the onion, the tomato, the pea, the bean, salsify, such herbs as parsley, thyme, mint, sage, and marjoram; and the spices, nutmeg, clove, cinnamon, and pepper—with salt. There are no soups superior to those made with tomatoes, chervil, spinach, asparagus, and celery, and there are none so cheap as those prepared with potatoes, artichokes, and onions. Stews, fritters, pies, and puddings, are all made and seasoned with vegetables, and where a very little meat is employed some of the most appetising dishes which are known to the writer can be prepared at very small cost. Here is an example of a savoury pudding which would be nothing without the aid of the garden.

Two ounces of finely chopped lean meat—mutton, beef, or pork, as preferred—2 oz. of chopped suet, and a fairly large onion also chopped fine, are mixed with 12 oz. of flour, and flavoured with finely powdered sage, parsley, and thyme. To this a teaspoonful of baking-powder is added, and the whole mixed with skimmed milk, or new milk and water, for conversion into a large round

dumpling. For serving the sauce may be made, from a penny packet of gravy powder or soup, and the dish will be found delicious. If this is cooked for dinner and supplemented with salsify cooked in a baking dish in the following way, the meal will be found fit for a king.

The salsify is washed, cut into small pieces—and if it is thick it must be cut down the centre—and boiled in a little water which has been salted, care being taken that the water is not so large in quantity that some will have to be thrown away after cooking. To 1 lb. of salsify add 4 oz. of flour, three eggs beaten up, $1\frac{1}{2}$ pints milk, and 2 oz. margarine, with salt, herbs, or spice, to taste. This dish is baked until the salsify is quite tender.

To the gourmand these dishes may not appeal. He believes that nothing less than a joint of meat, fish, game, or fowl—or all—is sufficiently substantial to give him strength and satisfaction. This is all wrong. Domestic animals are provided with digestive organs which closely resemble those of ourselves. The horse manages to extract sufficient nutriment from oats and hay to provide him with strength, while cattle obtain from grass, turnips, and cereal meals sufficient food to produce meat and milk. It is precisely the same with the man who takes pains to compile the ration for his stock with much greater precision and care than

he devotes to his own food. I have never met with an instance in which a well-prepared dish of vegetable food, cooked with the assistance of milk, butter, or eggs, has not given satisfaction to the average—if somewhat fastidious—man. The large number of vegetables which are at our command enables a good cook to provide innumerable dishes, not only from a cookery book, but concocted by herself.

By high cultivation, and with the assistance of artificial manures, large and varied crops can be grown in the garden to last from June until the early spring of the next year. In my own case I have still (the middle of February) abundance of leeks, parsnips, salsify, artichokes, beet, onions, turnips, celery, and green-stuff, with some growing lettuce and spinach, which furnish the table with a daily variety. French beans were preserved in the autumn, and these, too, are available. Thus, with bread, flour, milk, butter, margarine, cheese, dried peas and beans, and potatoes, these are a means of reducing the butcher's account to vanishing-point. This, however, is not all—for home-grown apples and pears are still going, while plums, damsons, and other bottled fruits provide for the remaining dishes of the table.

The *Potato* always stands first among the vege-

tables of the garden, and there is practically no other variety upon which life can be maintained in health and strength. When acting as Commissioner for the *Manchester Guardian*, during the famine in the west of Ireland in 1897, I had abundant opportunities of observing how well those who obtained a sufficient supply of potatoes were able to work and to maintain physical proficiency. It has been shown by prolonged experiment in Denmark by Dr. Hindhede, the chief of the National Nutrition Department, that man can perform considerable labour on potatoes with the addition of a small quantity of margarine, and continue to do so for many months in succession. Apart from its nutritive value the potato possesses two important medicinal properties: it assists in the prevention of fermentation in the intestine—an action which is precisely the reverse of what has been ascribed to it—while it is shown by the above experimenter to dissolve uric acid, and thus to be of the highest value to persons who suffer from this particular poison.

Although an average potato contains nearly 20 per cent., or about one-fifth, of its weight of starch, $1\frac{1}{2}$ per cent. of protein, or muscle-making food, and almost no fat at all, it must be pointed out that the tuber varies considerably, and this variation is also affected by cooking. Thus, when

boiled, the potato loses a large proportion of its protein and minerals. Baked, steamed, roasted, or fried potatoes are all good and subject to no waste. To make the most of the potato it must be sound, robust—not old or shrunk—and of a rich variety. The last fact, however, the average consumer will find it difficult to ascertain. Waxy potatoes are richer than those which are mealy, but not so digestible. The juice of the potato is rich in nutritive matter, hence the importance of avoiding any process by which it would be wasted. Few persons consume the skin of old potatoes—the majority scooping out the interior of those which are baked. In this way the loss of nutritious material is considerable, as the skin and the layer contiguous to it are much the richest portions of the tuber.

It is useful to know that potatoes produce on a given area of land a very much larger quantity of food than any of the cereals or pulses. Thus, while a very heavy crop of wheat, 60 bushels to the acre, weighing over 3600 lb., contains approximately 2770 lb. of nutritive food, a twenty-ton crop of potatoes provides 10,000 lb.—and this weight has been exceeded on an acre of land.

The *Artichoke* comes next in value to the potato as a food, although it is not so popular as it ought to be. It possesses one property, however, which

the potato does not—it will grow on very poor land, and on land of almost all classes, and should be found in every garden. It contains 18 per cent. of food—*i. e.* the nutritious and digestible material remaining after allowance is made for fibre and water. Artichokes are a valuable addition to the list of those vegetables which form a nutritious diet.

The value of the *Parsnip* has not been fully understood—its food contents being variously estimated. Like all roots and bulbs, parsnips should be young—the old roots containing a large proportion of indigestible fibre. Like turnips, this root takes up water in boiling, and it is therefore better baked and browned. Again, like the potato, it is immensely improved by being baked under meat; its flavour is not only increased, but it is enriched by the fat and gravy falling upon it. Parsnips make excellent fritters. They are, too, one of the last winter vegetables which successfully withstand frost.

The *Turnip* takes a much lower position, as it contains less than 10 per cent. of food—a portion of this being lost by boiling. Something, however, depends upon the variety of turnip employed. The yellow variety is richer than the white, while the swede is richer than either. Turnips should be eaten young, for, when properly cooked, they

almost melt in the mouth; but, like most vegetables, they become fibrous, innutritious, and difficult of digestion when fully mature. Mashed with thin cream they make a delectable dish.

Carrots are rich in sugar, and when young and tender their flavour is at its best. As a nourishing food they are much superior to turnips, but the practice of keeping them in the ground to the end of the growing season in order to gain size is to deprive them of their best qualities. Mature carrots are coarse, fibrous, their delicate flavour is lost, and they are not only much less nutritious, but difficult of digestion. Carrots, too, lose a considerable quantity of their nutritive properties by boiling—all their constituents suffering. Carrots may be stewed with much greater advantage, as in this process nothing is lost.

Onions and *Leeks* are both good foods if they are cooked with sufficient care to prevent a loss of their food constituents. Eaten in a raw condition by men engaged in hard physical labour, they afford much support, but owing to the quantity of fibrous matter they contain they are not easily digested. This fibre, however, is a useful property, promoting healthy movement of the bowels by stimulating their activity. Onions are of great assistance to consumers of the cheaper kinds of food, owing to the piquancy of their flavour,

and the relish they supply when consumed with bread-and-cheese and the plainer forms of meat. Just as the onion adds much to the value of steak fried with it, so when fried with rice or potato in dripping or margarine it makes a much appreciated dish. The onion, too, is a prime factor in the simpler soups of the French; it is an essential ingredient of various fritters, and provides flavouring which goes so far in preparing cheap foods for an endless number of dishes. Leeks, which are almost equally nourishing, are cooked in much the same way as the onion, but cooked alone or served with white sauce.

Beetroot is not only one of the most nourishing vegetables, and one which should be grown more extensively, but it is the great source of our sugar supply. In France this plant, almost unknown on British farms, covers 600,000 acres; in Germany 1,250,000; in Italy 133,000; in Russia nearly 2,000,000 acres; and in Sweden, Holland, Belgium, and Austria considerable areas of land. The beet is a prolific plant, which should find a place in every garden, producing, as it will, 2 cwt. to a rod of land. It is rich in sugar, of which it contains about 15 per cent., so that a pound provides nearly 2½ oz. From this point of view it is, next to the potato, one of the richest winter vegetables.

Celery is popular, both in its cooked and its

uncooked condition, but, well masticated, it is more nourishing when eaten raw. Boiling removes some of its most valuable properties, which are lost in the water. When, however, it is employed in the preparation of soups and stews we get its full value, and in these it forms a useful addition to the food of the table. About one-tenth of the weight of raw celery consists of nourishing food. Very large weights are grown on small spaces of land by farmers, who, by employing abundance of manure—natural and artificial—produce “sticks” which reach weights of 6 lb., and which sometimes average 2 lb. over a whole field. Celery makes excellent fritters, and every experienced house-keeper knows that it makes equally excellent sauce.

Spinach should be grown in every kitchen garden in its winter and summer varieties. The summer variety will produce 1 to 1½ cwt. to a rod of land, and the winter variety as much as 3½ cwt. Spinach is not one of the most nourishing foods in the common acceptation of the term; its value consists in the presence of minerals which are as essential to health and vitality as the more substantial materials in grain, potatoes, and milk; and for this reason it is properly regarded as one of the most important of foods. Spinach can be stewed, made into soup, pudding, or pie, and,

indeed, served in numerous ways. The public should, however, refrain from consuming spinach which has been preserved with the assistance of drugs.

Lettuce is the one form of salad which can and should be eaten all the year round. Poor as a foodstuff, like spinach it possesses two properties which make it of inestimable value. It is an excellent laxative, while the minerals it contains not only exert a vitalising influence on the blood, but by their soothing properties assist in the extension of sleep. Lettuce can be cooked like the cabbage, and, eaten with a savoury sauce, it adds to the charm of a well-prepared meal. In a well-managed garden lettuce will produce, in good hands, 3 cwt. of salad on a single rod of land. Lettuce eaten in a salad should be well dressed with olive oil—and this should be pure and guaranteed—but never with vinegar, which possesses no useful property as a condiment. Lemon juice is the best acid to use for this purpose, and this with a sprinkling of chopped chervil will, when no other green salad can be obtained, produce a much-relished dish. A chopped onion, which should be found in every garden in winter as well as in summer, is a useful addition.

Salsify is one of the substantial root foods grown in the garden, although it is so little known.

It is superior to the turnip, the carrot, or the parsnip, and contains more of the muscle-building material (protein) and fat than any fresh vegetable, with the exception of the pea, and possibly the Brussels sprout. It may, too, be safely remarked that, with the exception of the potato, salsify stands as one of the heads of the list of all vegetables as a nourishing food. When the potato is boiled, however, it, too, gives way to salsify. One pound of salsify—and the larger it is the better, if it is tender—contains $2\frac{1}{2}$ oz. of nourishing food. The young leaves of the plant may be used as a salad in a similar way to the leaves of chicory, to which it is closely related.

Asparagus, although a tender and delicious vegetable, is a luxury. A pound, which may cost half-a-crown, contains less than an ounce of food, the balance consisting of water and fibre. Asparagus is a tempting addition to the dinner-table, and makes excellent soup, but it finds no place in an economical diet.

Kohlrabi.—This plant, which is practically a combination of the turnip and the cabbage, to both of which it is closely allied, is grown for farm stock in this country, but in parts of the Continent it is commonly grown in the garden as a vegetable for the table—the bulb alone being used. It is a richer food than the turnip, although

not so sweet to the palate; but, properly cooked, and served with savoury sauce, it is not only most agreeable, but one of the most economical of garden vegetables.

Green Peas may be eaten in the usual way or with the shell. In the latter case it is necessary to grow or to buy a special variety known as the "Sugar Pea" or the "Mange tous." In both forms it provides abundant nourishment, but it is too costly for most people to buy. About one-seventh of the weight of the green pea consists of nutritive matter and is rich in muscle-making food.

French Beans and *Scarlet Runners* are both useful, when consumed in their green condition. The seeds, when ripened and dried, are among the most nourishing of all foods known to man, with the exception of the kernels of nuts. These vegetables are usually eaten with the pod, and are sometimes served as a separate course. They are less rich in their green state than shelled beans; they are less digestible, and are better eaten young and in small quantities by those who are advancing in age. As in the case of the pea, the cost must be taken into consideration when selecting vegetables for home-consumption, as the demand for both foods often exceeds the supply. As in the case of so many other green vegetables, the loss of food material caused by boiling is considerable.

Cauliflower is rich in sulphur, and for this reason it is fertile in the production of gas (wind) in the intestines of those who have not normal powers of digestion. I have eaten it raw as a salad in a mixed form, but cannot recommend it, although it provides more nourishment. Cooked in the ordinary way, made into soup, or baked in milk after steaming, it is one of the most delicious of vegetables, although it is not especially nourishing.

Brussels Sprouts are much superior to the cabbage, the savoy, or Scotch kale. When young, tender, and well cooked they are not to be surpassed by any other vegetable of their class, and while they contain about one-tenth of their weight of nourishing food, some of which is lost in boiling, they are rich in muscle-builders—a fact which makes them of less value to the gouty and rheumatic than cabbage.

Cabbage.—The best part of a cabbage is the white heart, and there is no more popular dish among our country-people than boiled bacon and this part of the plant cooked with it. Cabbage is the one vegetable which the working man grows in his garden before all others, if he takes any pride in it at all, and for this reason he is usually able to obtain it all the year round. Useful with all kinds of meat, it can be prepared as a separate dish—a stew, a fritter, or stuffed. With the

assistance of bread, milk, some spices and herbs, cabbage, formed like an omelette, becomes one of the most delicious of dishes.

Rhubarb contains very little nourishment, but it is one of the best laxatives grown in the kitchen garden, and as a preliminary to summer fruit it takes a place by itself. Owing, however, to its acidity, it is not suitable to all persons, nor is its peculiar property neutralised by the addition of sugar, as some people suppose, although in this form it becomes more agreeable and can be more readily eaten. It is more useful to young people than to adults of mature age, with whom both the acid of the stalk and the sugar sometimes disagree. It should, therefore, be eaten with moderation.

CHAPTER IX

FRUIT AS FOOD

IN this country fruit is regarded rather as a luxury, or as an addition to food, than as food. Fruit, however, is of far greater value than is supposed, and, taking the community as a whole, it is essential to its health. We are told that by eating large quantities of fruit we upset our digestive system, distend the stomach, which is not intended for bulky foods, and create considerable discomfort. That, however, is not the experience of the fruit-eater. These troubles—if troubles they are—are owing to the fact that we are not accustomed to eat fruit as part of our regular diet.

There is no more certain way to ill-health than sluggish and imperfect action of the intestines. This is the foundation of many diseases. By the regular consumption of fruit, however, this practically never occurs; perfect regularity is established, with a clean tongue and a healthy system throughout. Fruit plays an equally important part by enriching the blood when it improves the complex-

ion and imparts greater beauty to woman. The weak and anæmic, by consuming white bread, and foods of similar character, rice, tapioca, macaroni, and potatoes, without either the husk or the skin, fail to obtain the minerals which are as essential to health as either of their other constituents. These materials, chiefly iron and phosphate of lime, are often taken in medicinal form, instead of in fruits, in which they are so abundant, and in which they exist in a natural, and therefore superior form.

Although it is possible to live entirely upon some kinds of fruit, such as the grape, the banana, the fig, and the date, as so many do in the world, it is a recognised fact that with us a mixed vegetable diet is the best, and as it is now possible to obtain fruit all the year round, there is no reason why any normal individual should go without it. Various Eastern races live almost entirely upon fruit foods, while in this country there are many fruitarians and vegetarians who have accomplished wonderful feats of labour and athletics upon their particular diet.

FRUITS

Among the more popular fruits *Apples* easily take the first place, and, as one who has consumed them daily for years, I can confidently recommend

them as among God's best gifts to man. They are an excellent food, a simple and natural laxative, a helper of sleep, adapted to all meals, and a purifier of the system, maintaining the body in a condition of health, elasticity, and equilibrium which no other food can sustain. The apple should be eaten ripe; like fruits of other varieties, nature cannot deal with it successfully while it is still immature, for it is then an unnatural food. It should, therefore, be sweet, sour apples not being adapted for consumption uncooked, in which form they are always the best. Although the skin is difficult of digestion by all who have been unaccustomed to eat it, it forms a most important part of the fruit, containing mineral matter which we cannot afford to discard. Apart from the eye and the stalk, the whole fruit should be eaten, and thoroughly masticated. If, owing to bad teeth, this is impossible, it may be finely grated and prepared in various ways, with ground nuts, squashed bananas, blackberries, or strawberries, condensed milk, coarse soaked oatmeal, rice pudding, or bread crumbs, or eaten with biscuits, white or wholemeal bread, and butter or cheese. When ripe apples cost 2*d.* a pound, a penny will buy nearly 100 units of energy. Apples should never be boiled; the process, as in the boiling of vegetables, is followed by considerable loss of

the food they possess. Thus, a boiled apple loses one-third of its nutritive matter; it should, therefore, be baked, roasted, or stewed, but it is much more useful when eaten raw.

The food-stuff in fruits chiefly consists of minerals, sugar, and gum—the latter forming a jelly in some varieties after boiling. Man cannot live long upon fresh fruit alone, if we except the grape and the banana, both of which are exceedingly rich in nutritive matter—for he could not eat a sufficient quantity. On these fruits, however, men do manage to live natural lives, with some little assistance, for they are deficient in the muscle-forming protein. The fruit-eater seldom desires to drink, the water in his food providing for his requirements in this direction.

The ripe *Pear* contains from 8 to 12 per cent. of nutritive food, and may be obtained in this country from September to March, during the whole of which period I have been supplied by my garden. Pears are better peeled than apples, and should be eaten raw—although we must except those varieties which practically refuse to mature, and which are consequently stewed.

Although there is a curious and sometimes inherent belief in the unsuitability of stone fruit—it is on the contrary of considerable value in our regular diet. Now that such fruit can be

preserved in its natural state, it is at our disposal all the year round. Stone fruit should always be eaten with the skins, which are rich in minerals, and which by their gentle stimulation of the intestines promote healthy action. Passed through a fine mincing-machine after the removal of the stones, *Plums* make excellent and sustaining porridge when mixed with soaked prepared oats, ground nuts and condensed milk, and in this form they can be eaten without any discomfort by many who refuse them in their natural state. Plums contain from 10 to 14 per cent. of nutritive matter, mostly digestible—the more delicate varieties being the most suitable, as there is less indigestible fibre in the pulp.

Cherries may be regarded in the same light as the plum, which they resemble in composition, and in their influence on health. The softer, large Blacks are preferable to the firmer White varieties, which require more mastication.

Grapes are, it is almost needless to say, one of the most delicious and valuable of all fruits. Rich in sugar, they vary enormously, some varieties being almost twice as rich as others. They are easily digested without the skins and pips, and contain almost as much nutritive matter as meat, and that of a more useful character. The richest grapes, however, are much too costly for general consump-

tion, while the imported varieties, when they cost 4d. a pound, as they frequently do, provide about 80 units of energy for a penny. The grape is a useful and simple laxative. For some disorders, caused by over-eating, or the consumption of too much animal food, grapes are given as a whole or partial diet to patients, who are sometimes blessed with remarkable cures. More careful discrimination, and less food, of which grapes and other fruits should form regular portions, would prevent many of these troubles. When grapes are dried there are few complaints of their skins by those who consume them.

Strawberries and *Raspberries* are exceptionally rich in water, and poor in food, which is chiefly present in the form of sugar. Both make an excellent porridge in their raw condition, and both are laxatives. These fruits play a greater part in their contribution to health than to food.

Gooseberries should never be eaten green, whether cooked or not. In this condition they are useless as food, and are always liable to upset the digestion of the strongest. Ripe gooseberries, although richer foods than other berries, are so little eaten, because so little grown for market, or saleable at a popular price, that they are not a food of importance. Like all fruits with pips they have a laxative tendency.

Currants may be included in the same category as the gooseberry, although the black currant is believed to exert some influence in enriching the blood, owing to the iron which it contains. It should be pointed out that, although some of these fruits possess small nutritive value, they exercise considerable influence on the appetite and in the enjoyment of the more substantial foods, and especially of those which possess little or no flavour to recommend them. The piquant principle in the black currant, for example, is an important addition to rice, macaroni, sago, tapioca, maize, and other milk puddings, as well as to those which are chiefly made with flour. As the digestion of food depends so largely upon that enjoyment which causes the flow of saliva in the mouth, it is obvious that fruits exercise a function which is next in importance to that of nutrition itself.

Peaches, Apricots, Nectarines, Melons, and Pines are all more or less luxuries, which do not in this country enter into the list of foods. The three stone fruits are of less value than the plum, the damson, and the cherry. The melon, like the marrow and the cucumber, is composed almost entirely of water. The pineapple is an especially healthy dessert fruit, containing nearly 10 per cent. of food, chiefly consisting of sugar.

The *Orange* is one of the most valuable of all

fruits when eaten in a perfectly ripe and sweet condition. It is rich in sugar, and when eaten with cream provides a food at once nourishing and highly conducive to fitness and health. During one summer season the writer made the experiment of eating two oranges before lunch and dinner daily for six weeks, maintaining excellent health. Sour oranges are better avoided, still more so when eaten with a liberal supply of sugar, which may cover but never neutralise the acid they contain. An orange should possess a thin skin and few pips. Its colour should be pale and its flesh juicy, with so little fibre that all can be eaten. The finest oranges are not brought to England, as those which are exported are removed from the trees before they are ripe. An orange perfectly ripe on the tree is a much superior fruit when gathered and eaten at once. Oranges take the next place to apples as a cheap fruit of the highest value to health eaten all the year round. They contain 10 per cent. of nutrient food, while the juice contains nearly 10 per cent. of sugar.

The *Banana*.—It has been estimated that this fruit provides more food on a given area of soil than any other plant known to man. It contains more food than any other fresh fruit, with the possible exception of the richest varieties of the grape. Some authorities state that the banana

contains 24 to 25 per cent. of feeding matter, of which sugar is the most important constituent; but, if we make sufficient allowance for the proportion which is indigestible, we shall probably bring down the figure to 15 or 16 per cent. Bananas come to us largely from Jamaica and the Canaries—the Canary variety being smaller and more appreciated, without adequate reason. In the West Indies the fruit, which is not popular with the rich, is sometimes given to cattle. It is gathered and exported in its unripe and green condition—ripening chiefly on the voyage. Bananas are dried and ground into flour, or partly dried, when they occupy less space for exportation. If six bananas weigh 16 oz. and cost 3*d.* they provide 100 units of energy for a penny—at a low computation—or more than any other fruit that is sold in its fresh condition.

The *Whortleberry*, *Bilberry*, or *Blueberry*, is closely allied to the *Cranberry*. It grows upon very poor soil on the hills of this and many other countries, and is especially rich in iron. It is of particular value to sufferers from anæmia and nervous diseases, and is one of the simplest and most effective laxatives among fruits. As a food its value is small. The whortleberry passed through a mincing machine and mixed with soaked prepared oats, or ground nuts, and condensed milk, pro-

vides one of the best forms of porridge for breakfast and supper. I can speak with confidence on these fruits from long personal experience.

The *Tomato*, although containing over 90 per cent. of water in its raw condition, and still more when it is boiled, possesses a value of its own. Prepared as sauce it adds to the enjoyment and digestibility of the food with which it is eaten; it makes soup rich and popular; and fried, grilled, or baked, and eaten with bacon and various meats, it provides that piquant flavour which adds a relish to all. The tomato, however, is best eaten in its raw condition, and so with a pinch or two of chopped onion, some olive oil and salt, it makes the plainest of the simplest foods, such as bread-and-cheese, as enjoyable as the richest.

DRIED FRUITS

Raisins.—This term includes *Muscatels*, which are dried while hanging on the vine, and *Sultanas*, which, like the common raisin of commerce, is dried in the sun as it lies on the ground. The raisin is a dried grape, and, unlike the fresh fruit, it is eaten with the skin, which makes it more useful both as a food and a laxative. White bread is, on this ground, improved when it is made with raisins or currants. Raisins, like dried currants, are rich foods—10 oz. containing 7 oz. of nutriment.

When they are cheap, they provide more units of heat or energy than any other fruit or vegetable common to our markets, with the exception of the fig and the potato. At sixpence a pound they are still a cheap food, as compared with red or white meat or fish.

Figs are equally as rich as raisins and currants, but, if we except the superior brands, they are usually cheaper. The fig is not only a very rich food, containing 75 per cent. of nutrient matter, but it is a well-known laxative of a high order. One pound provides 1400 units of energy, so that two pounds a day would sustain a man who is engaged in a sedentary occupation. A pound of bread—one of the cheapest of all foods—provides approximately 1200 units of energy, so that, although it is cheaper, pound for pound, than the fig, and more suitable when both are eaten alone, it enables us to more clearly realise the economical value of the fruit. In any attempt to live upon the fig, which is the staple food of some of the Arabs, it would be necessary to add some muscle-making material. This can be found in milk; and experience has taught fig-eaters among these Eastern races to make milk a portion of their diet.

Prunes are plums which are ripened on the trees and dried in the sun—although there are some

which are cured artificially. This fruit contains 75 per cent. of food, much of which is lost in stewing unless the juice is consumed. Prunes should be washed and soaked in cold water, and the liquor rejected. The fruit is a useful, and when obtainable at 4*d.* per lb., a most economical food, in spite of the fact that it is a stone fruit. Prunes are a well known, though very mild, laxative.

The *Date*, which is a fruit of a species of palm, is one of the chief articles of commerce in Arabia. One variety ripens on the trees and is ready for packing and shipping at once. Others go through a process of preparation. While, too, in one variety, each fruit is packed separately, another is packed in bulk and arrives in this country in a homogeneous mass. Dates, too, which are much superior when eaten just off the tree, are pounded by the Arabs and made into cakes which form one of the most important foods of the country in which they are grown. They provide part of the rations of horses and camels, and, owing to their highly nutritive properties, are as sustaining as almost any food that is known. In a pound of dried dates there are 11 oz. of nutritive food, of which a great portion is sugar, and the remainder nutritive gum and muscle-building protein. At 3*d.* per lb.—the price paid by the writer during 1915—a penny spent in

dates at this cost provides 500 units of energy. Thus this fruit is one of the cheapest of foods on the market.

SALADS

Salads are eaten in three forms: (1) as a green *mélange* of lettuce, endive, onion, watercress, radish, beetroot, tomato, cucumber, sorrel, and chicory, flavoured with chervil and dressed with olive oil and vinegar or lemon juice; (2) as vegetables, which are usually cooked and eaten separately or mixed, after dressing with olive oil, herbs, and lemon juice; these consist of potatoes, French beans, peas, beetroot, tomatoes, carrot, celery, and spinach; and (3) fruits in great variety—English fruits, fresh or bottled, being mixed at will with pineapple, prunes, and orange. These forms of salad are of great value in the maintenance of fitness, when eaten without an extravagant addition of sugar and cream. It is important to remember, in connection with these additions to the table, that the property of food does not consist solely in its nutritive value, but in its contribution to digestion and health. Vegetables and fruits, are all more or less rich in minerals, which are to a large extent lost in cooking. These properties are essential to the richness of the blood as well as to the manufacture and repair of the bones and

the teeth. Anæmia is next to impossible to a person who is a consistent and liberal consumer of fruit. Another point is, that health chiefly depends, in the normal man, upon regularity. This is often prevented when he reaches middle-age if he ignores those foods which, eaten with freedom, ensure it. Fruits and green vegetables are natural specifics, maintaining a clean, healthy, digestive track, promoting normal digestion, enriching the blood, and by these means assisting to ward off those forms of disease which seldom attack a body that is thoroughly fit.

The third point to remember is that, as an addition to foods of a more substantial character, salads often provide the appetising property. Cold meat, often stale or badly cooked, is tasteless, or fails to tempt the appetite of those before whom it is placed. There is no "watering of the mouth," or, in other terms, no flow of the saliva, which is one of the important digestive juices. It contains a material known as Ptyalin, a salivary diastase, which largely assists in the conversion of the starch—which we consume so liberally in bread and all cereals and pulse—into sugar, thus enabling it to be quickly and freely absorbed into the blood. When a handsome, tempting salad is added to the disappointing cold meat, the pleasant anticipation of eating returns, with the free flow of saliva,

and then the food is eaten, enjoyed, and well digested. Thus it is that so much depends upon the cook and her method of mixing all salads, as well as upon their preparation. Some vegetable salads may be mixed with fruits, and especially with the apple chopped or grated, or with bottled plums and prunes which have been well and long soaked, not boiled, in cold water. Last of all, it may be pointed out that as a raw fruit or vegetable is much more nourishing than a cooked fruit or vegetable, owing to the loss of energy or food material in cooking, a green, or uncooked, fruit-salad is of much greater value than cooked fruits or vegetables which usually form so large a portion of our meals, and this applies much more emphatically to those that are boiled.

TEA

Although I am not a regular tea-drinker, having long found that it acted as an impediment to sleep, I recognise the importance of discussing the national beverage. It is well, however, that tea-drinkers should know something about the peculiar properties which make tea at once so agreeable and yet so deleterious to health. Tea is a stimulant—its action on the central nervous system and the heart being due to the presence of caffeine, which is present to an average extent

of about 3 per cent. According to Hutchinson, who made numerous experiments to ascertain how much caffeine infused tea contains, it was found that a cup made with 8 grammes of the leaf infused for five minutes in 300 cubic centimetres of water, contained from $\frac{3}{4}$ grain to $1\frac{1}{2}$ grains, according to the variety of tea employed. Thus, a person drinking three cups of such tea may consume over $3\frac{1}{2}$ grains, together with 6 to 8 grains of tannin, a styptic material which exerts a hardening action on the delicate mucous membrane of the stomach and intestines, and this materially contributes to the inhibition of normal digestion.

Tea assists, too, in the creation of flatulence, and when mixed with the digestive juices and the food in process of digestion in the stomach it retards their action. A little soda put into the pot with the boiling water sometimes prevents this.

Caffeine, according to the British Pharmacopœia, not only acts as a stimulant to the heart, raising the pulse and pressure of the blood, but stimulates the kidneys, and influences that part of the brain which is connected with physical functions, inducing wakefulness and mental activity. With large doses a person may become restless and noisy, with a rise of temperature, and even followed by convulsions and paralysis. While its prolonged use tends to

fatigue the heart, it is perfectly true that caffeine facilitates the performance of physical work.

When on one occasion, during a period of ill-health, I was confronted with a week of public work which entailed long and laborious hours, I was supplied with small doses of caffeine, which were of great value at the time; but I was urged by the accomplished physician, by whom I was advised, to abandon the dose at once owing to the dangerous influence to which I have referred. As a medical dose of caffeine varies from 1 to 5 grains, it will be readily seen how easy it is to take it in tea, and thus to damage the constitution.

Green Tea contains more tannin than Black Tea, and China Tea less than Indian Tea. Good tea should not be hard or astringent. It should be made immediately the water boils, and in a warm teapot or cup. The tea should be placed in an infuser, in which it should not remain more than five minutes, when it should be withdrawn from the pot, inasmuch as while the tannin increases with each minute the flavour diminishes. The process can be carried out in another way by infusing in one teapot, and pouring the infusion into another, which has also been warmed, and thus removing it from the leaves. The caffeine in tea is practically all dissolved from the leaves when the boiling water is poured upon them.

Milk should be added to tea, if only for the purpose of neutralising some of the tannin, for it possesses this property, while, like sugar, if diminishing the flavour, it adds to its nutritive value. Tea should contain no dust, nor produce an infusion which is black or dark red in colour.

COFFEE

It has been said that coffee-drinking in this country is discouraged by the fact that we don't know how to make it. The truth is that we are so accustomed to use a very small quantity of tea in making a cup that we cannot grasp the necessity for using so much coffee as is necessary to make it really good. A large cup of black coffee cannot be made with less than an ounce. This, however, with the addition of milk, will make three cups of milk-coffee.

Like tea, coffee contains caffeine, and in an ordinary cup about the same quantity. Also for this reason it is a powerful stimulant, and one which prevents many people sleeping. Coffee, too, is not a fit drink for the dyspeptic unless it is exceedingly weak, when its exhilarating properties and the flavour which gives pleasure to the drinker are practically destroyed.

Coffee should be fresh roasted and fresh ground to be at its best. It should be kept in air-tight

tins or jars, as its exposure quickly removes its delicate aroma and flavour. It should not be boiled, but made with boiling water, although there are infusers on the market in which the coffee is placed and boiled on the table—makers sometimes recommending boiling for several minutes. Coffee is believed to exert deleterious action on the nerves—as tea does; but it is possible that this is marked only on persons of a nervous temperament, who would be well advised to refuse both. One fact is certain—that, as with alcohol, it is impossible to consistently take a powerful drug like caffeine day by day without permanent harm to the system. A man may drink tea and coffee and keep tolerably well until the end of his days—like some consumers of alcohol—but he is the exception to the rule that the great majority do not, while in his case his days might be prolonged and his health better by refusing the popular drinks.

COCOA

The cocoa-bean, from which pure cocoa is derived, is somewhat bitter in flavour and contains about one-half its weight of oil. In the preparation of commercial cocoa it is roasted, ground, and deprived of much of this oil, and is then mixed with sugar and some form of starch. In giving evidence before the Committee on the Adulteration

of Food a manufacturer stated that cocoa was mixed with sugar and arrowroot, or some other farinaceous material. Cocoa, like coffee and tea, contains a poisonous alkaloid, and this is closely allied to caffeine, to which reference has been made. Nevertheless cocoa is much less of a stimulant than coffee and tea, while it is more of an astringent, and is frequently given in some parts of the Continent in cases of diarrhœa. Cocoa, while useful as a foodstuff, possesses little value when made solely with water—the small quantity employed being less nutritious than the same weight of a hard brown biscuit and butter. When viewed in this way it will be seen that as a food cocoa has no claim on the public owing to its extravagant price.

A similar remark may be made with regard to *Chocolate*, which is a product of the ground cocoa-bean mixed with sugar and starch. It is certainly a nourishing food, but its price constitutes it a luxury.

JAM

We may fairly assume that, taking one type of jam with another, one-half of its weight consists of sugar, and here we arrive at a test of its fitness as food. An average lump of sugar provides twenty units of energy, Thus, a pound pot of

jam would provide 920 units from the sugar alone, or, assuming a consumption of four ounces a day, 260 units when adding the value of the fruit.

I find, that when purchased by the hundred-weight, the more popular jams—plum, plum and apple, raspberry and apple, gooseberry, and red-currant—cost $3\frac{1}{4}d.$ a pound (1915). At this price 5 lb. of jam cost no more than 1 lb. of butter; but what of its relative value as food?

One pound of butter provides 3600 units, whereas 5 lb. of jam provide 5250. Practically the energy value of $3\frac{1}{2}$ lb. of jam is equal to that of 1 lb. of butter, and at a good deal less cost.

These remarks, however, are not intended as a glorification of jam, which cannot take the place of butter, or an equivalent fat, although butter is not an essential food. Fat, however, is an essential to health, and it can be obtained in a much cheaper form, without the least disadvantage to the consumer. Where a day's ration includes bacon, milk, and fresh meat, butter is not of importance, and jam may therefore be used.

As there is a limit to the fat which can be eaten, so is there a limit to jam, but the system of a labourer or carter can assimilate and convert into energy what the system of a man in a sedentary occupation, or taking little physical exercise, will reject.

To the man in the street sugar is sugar, but there is a wide difference in the behaviour of that obtained from different sources. Sugar from the cane or the beet, which now provides the sugar of commerce, differs from sugar in milk, grape sugar (dextrose), or the sugar present in fruits.

Sugar present in fruit has a remarkable effect on nutrition, and can be eaten in far greater quantity than raw or commercial sugar. The latter eaten too freely—and a small quantity is often sufficient—will cause irritation, acidity, pain, and other freaks of digestion. When sugar is employed in the manufacture of jam, these phenomena are fewer, or they disappear altogether. The cause is worth knowing, for the wise man will avoid what may cause him distress. The world, however, is not composed of wise men, for I find that appetite rules rather than wisdom, and in consequence medicine flourishes.

Jam which has been well boiled, like that made by the economical housewife, contains a large proportion of “invert” sugar, which is more freely digested than raw sugar, and can be eaten with greater impunity.

This form of sugar is produced in making jam by the action of heat and the acids of the fruit. It is, in a word, a combination of “grape” sugar and fruit sugar, but loses some of its sweetness in

the process of cooking. Invert sugar is much less of an irritant than raw sugar, and reduces the trouble caused by dyspepsia. Honey is an excellent example of invert sugar, of which it contains nearly 12 oz. to the pound, and is well known as a delightful, nutritious, and easily digestible dainty, although, as with everything else, too much can be eaten at once.

The most nutritious and useful of all varieties of jam are those made from the plum, a mixture of plum and apple, the damson, the apricot, the gooseberry, the currant, and the whortleberry, which is rich in iron and of special value to the anæmic and nervous. The plum and the apple otherwise stand at the top of the list, but in all cases the skins and the acid, like the malic acid of the apple, plays an important *rôle* in the economy of health.

Whatever may be the practice of the consumer of jam in time of peace, it is a moral duty to employ it as an economical food in time of war.

As an adjunct to the breakfast and tea tables it is used as a luxury, and eaten with butter on bread, and sometimes with cake. I have, indeed, in the houses of the super-extravagant, seen cream added as well.

This is all wrong, spoiling alike the moral and physical fibre of the indulgent. Eaten in a rational

way jam is a food, and now that butter is dear it can be used with advantage instead. When butter is 16*d.* per lb. a penny spent upon it buys 225 units of energy, but a penny spent in jam buys 328, or nearly 50 per cent. more.

From this point of view, butter is more costly as a food. In butter, however, there is no other feeding matter than fat. Jam provides the minerals and the protein as well as the producer of energy—sugar. Those who can afford it eat too much butter; to these jam is an excellent change.

In round figures those who are accustomed to eat one ounce of butter, costing a penny, can replace it with two ounces of jam, costing one half. An appetising change is a finely grated apple, mixed with a smashed banana and some condensed milk. This will provide a ready-made jam, costing 2½*d.* to 4*d.* per lb. The regular consumer of fruit, raw or preserved, with not too much sugar, will maintain his mental and physical health, given normal exercise, which he can do in no other way.

CHAPTER X

IS MEAT AN ESSENTIAL?

WHAT would happen if the supply of fresh meat was stopped altogether? The question is easily answered—*meat is not an essential.*

However agreeable and however useful it is supposed to be to the young, there is no doubt about its bad influence upon the health of the middle-aged man. This is not a mere pious opinion, but the result of the test of four years of the teaching of Chittenden, Fletcher, Bircher and others who have demonstrated the fact that, by abandoning flesh, there is a gain in health, strength, mental capacity, the joy of living and length of life, which is unknown to the average man. Yet I do not write as a vegetarian. Where the principle is recognised the practice may be so transformed that meat-eating—and fish is included—is no longer observed as an essential of everyday life.

I find from the official returns that in the provincial markets of the country the wholesale price of the best lamb is 1s. to 1s. 4d. per pound, mutton and beef, 1s. to 1s. 6d. These figures are prohibitory to 90 per cent. of the public, but so long

as there are buyers farmers will sell, and instead of creating a reserve for the time that may possibly come they are diminishing the stock of the country.

The market price of meat, however, is not the best guide to its cost as a food. A pound of beef without bone or waste, but with a medium quantity of fat, and costing a shilling a pound, provides only four to five ounces of nutritious food, for the remainder is water. Thus a pound of that food eaten in beef costs from 3s. 3d. to 4s. Where bone and other inedible portions of a joint are included the cost is still higher. I take an example direct from the kitchen. A quarter of lamb weighing 9 lb. 2 oz. which was baked in the oven weighed when ready for table 6½ lb. At the wholesale market-price referred to above, this would have cost 1s. 10½d. a pound! Lamb contains more water than mutton or beef; and, therefore, allowing for bone, the nutritious portion of this joint would have cost the consumer approximately 7s. a pound. As lamb is a much less suitable and perfectly balanced food than bread, oatmeal, potatoes, or milk—while costing an enormously higher price—it is folly to urge that it is essential to life.

The nutritious material in the lean of flesh is a substance known as Protein, the function of which is to build up the muscular tissues of the young and to maintain them in repair in the adult. For

the latter purpose the quantity which nature demands is much less than the meat-eater consumes. It exists in almost every composite food which is placed before him, and so far is this true that, where meat is excluded altogether, it is difficult to avoid taking sufficient to suffice for his bodily wants. I have calculated the quantity in my own diet on many occasions, and find it is less than one-half of the minimum which an average man is supposed to require, according to the standard which a few scientific men have laid down.

If these facts are true—and they have been abundantly proved by public demonstration, and by many persons known to me in private life—it is obvious that a diminution in the quantity of meat eaten, still more where it is abandoned altogether, will effect a great personal as well as a great national saving.

Here is an example of the fact that meat is by far the most costly and extravagant of our ordinary foods. Where lean meat, without bone, costs 1s. a pound, it provides approximately forty units of energy for a penny. Where the lean is accompanied by fat its food value is greater, but in that case the buyer is paying a shilling a pound for fat, or double its value. On the other hand, where wholemeal bread costs 2d. a pound, a penny pro-

vides 600 units, so that this bread is worth, from the point of view of nutrition, twelve to fourteen times as much as the lean portion of meat, or still more when the bone is included. Rice at 2*d.* a pound provides 800 units of energy for a penny.

It is claimed that meat alone makes a meal substantial, although the lean is chiefly composed of water, and that it is a great source of strength to the system—invigorating, muscle-building, and vital to life. There is nothing to warrant this belief. The more meat a man eats—if he depends upon no other assistance—the more he loses vitality. Strength, or energy, is the product of the starches and sugars, which are the chief constituents of foods of a vegetable character, and of the fats derived from the foods of both kingdoms. The protein of meat is the source of construction and repair of the muscular tissues, and although it is able to assist in the production of energy, that assistance is obtained, as we have seen, at much greater cost.

The elephant, the strongest; the horse, the fleetest; and the camel, the most enduring, in animal life, are vegetable feeders, extracting their energy, as man does, from vegetable foods.

Constant or excessive meat-eating becomes a danger to health, and even to life, when man reaches middle age. The system becomes charged with a residue much larger than it has been

constructed to deal with. Pressure is put upon the kidneys, the liver, the intestines, and finally on the heart, with the result that some organ breaks down altogether, or, in men with stronger constitutions, the production of uric acid is so large that gout or rheumatism ruins the health, the joy of living, and the usefulness of life. This is the verdict of those special physicians to whom I was originally indebted for instruction and facts, and who have made a life study of a subject which others have ignored. I refer to the influence exerted among hundreds of patients who have abandoned meat-eating, and who are in consequence living vigorous, useful, and happy lives.

The meat-eater is a greater drinker than the vegetarian, and the more meat he consumes the more he wants to drink, and to drink alcohol. His animal passions are greater, and his temper less under control, for meat is a stimulant. If meat must be eaten it is better confined to fat bacon, or, if a fresh joint is demanded, to mutton, which contains more feeding matter than beef. The best joints are not of necessity more nourishing than those which are cheaper, although they may be superior in texture and flavour. So long, however, as men have money to spend they will, as a body, eat meat; but if they cannot abandon it, they can at least consume less.

CHAPTER XI

THE SELECTION OF FOODS

THERE is a great deal to be gained by care in the selection of foods. We have all something to learn about their market and nutritive value. One loaf of bread, one pound of beef, one slice of cheese, differs from another. No housekeeper should accept the word of a shopkeeper's assistant, who considers it his duty to sell, and to this end to praise, as he recommends the goods that he offers. As a rule a shopman knows nothing about food—how it is made, or prepared, of what it is made, or where it is made.

The housekeeper can learn a great deal about food if she is willing, but she, too, often declines to be told. The well-being of a normal house depends largely upon the housekeeper and the cook, for if food is well bought it is better and cheaper than when it is left to the tradesman to send what he likes, or when the buyer knows nothing about it.

Bread should be made in the home. There is no bread made by the average baker which can

approach a well-made home loaf, either in quality or cost. Thus money is saved, while the food, which is enjoyed more by the consumer, is also more serviceable. The best white bread is not the whitest, but that made from slightly tinted flour, which is richer in gluten, whether it is called household, bakers, or seconds. As gluten is a builder of muscle it is important that bread should be rich in this substance, which it is not when it is made of very white flour. If brown bread is made at home it should be the produce of wholemeal, and this should be guaranteed by the salesman, for brown flour is usually a blend and not wholemeal at all. White flour may be enriched in the muscle-building substance by the employment of separated milk.

Probably no food is purchased with so little care as *Milk*. Although the public are carefully protected against adulteration, milk is still poor in quality. Commercial milk, too, is artificially coloured that it may resemble rich milk. There are no simple means of testing milk either for its purity or quality, and the buyer is, therefore, at the mercy of the seller, for which reason he should deal only with tradesmen of reputation. There is, however, one thing a buyer can do—he can test the quantity he buys. The milk deliverer can, and often does, by consistently giving short

measure to his customers, make something for himself at their expense, and as there are usually two deliveries daily, or thirteen in the week, it follows that in the course of a year the loss may be appalling.

The finest type of *Butter* seldom finds its way on to the market; the average consumer must, therefore, be content with Danish, Irish, Colonial, French, Russian, Argentine, or British factory brands. The best plan in dealing with a reliable tradesman is at all times to order the same brand, and that, a brand which will keep in summer as well as in winter. It should always be tasted and returned if it is imperfect in flavour. Butter which is heavily salted, or in which the water can be seen in droplets, should only be accepted, if accepted at all, at a lower price. Butter should be kept in a cold store in the dark.

Meat.—The housekeeper should make herself acquainted with the form, quality, value and names of the various joints sold by the butcher—remembering that the flesh of the inferior parts of the carcass, if less tender and agreeable to eat than the superior joints, is equally useful as food. The loin of the bullock starts halfway down the back and reaches to the rump, which extends only a few inches towards the front of the tail, and nearly two-thirds of the way down each side, where it

meets the thin flank. The loin embraces six lumbar vertebræ and one vertebra of the back, together with the top end of one rib. The fore-rib, which comes next to the loin, embraces five dorsal or back vertebræ, and the top end of five ribs. The middle rib includes four dorsal vertebræ, and the top end of four ribs, while the clinch-rib includes three dorsal vertebræ, the top ends of three ribs, two cervical vertebræ, and the bottom end of the shoulder-blade. The brisket includes the breast-bone and the lower ends of eight ribs. The shin includes the elbow and bones of the fore-leg, while the clod and sticking part embraces five joints of the cervical vertebra (those next to the head). The aitch-bone, from *ischium*, the lower portion of the socket of the thigh-bone, embraces the lower portion of the hip-bone and the top of the thigh-bone. The topside is the inner portion, and the silverside the outer portion, of the thigh-bone.

There are fewer joints in a carcase of mutton. The most important are the leg, the shoulder, and the loin, which like the saddle extends from half-way down the back to and including the tail. The best end of the neck is that portion of the carcase which reaches from the loin halfway to the head and more than halfway down to the breast. The serag or worst end of the neck extends from the best end to the head. The breast is the

lower portion of the sheep immediately below the two joints of the neck, lying partly behind the shoulder.

Healthy beef should carry a fairly abundant quantity of pale straw-coloured fat, although in some breeds of cattle the fat is yellow. The lean flesh should be young, mellow, juicy, cherry red, and in rich meat mottled or marbled. The meat of an old carcase is tough to look at and to feel, less juicy, harsh and dull. This is especially the case with cow-beef, while bull-beef is neither marbled nor properly coloured, for it is dark and wanting in softness and touch. A joint may be tested for sweetness by the smell of a wooden skewer which has been thrust into the lean.

Fat beef is of greater value as food than lean beef. The fat is all food; the lean contains water and indigestible fibre to the extent of three-quarters of its weight.

A good carcase of mutton has alternate dark red and white natural bars above the loins. The lean should be a soft red, and the fat firm and white. The loin of the wether should be covered with half an inch of fat over the fillet, which forms the lean of the chops, extending to nearly an inch at the point of the scrag end of the chop bone. The fillet should be large, round, full and tender. A chop with a small fillet and abundance of fat is

extremely wasteful, for, as with the loin, nobody eats the scrag. Mutton should never be too fat, for the reason that, unlike the fat of beef, it is never all consumed.

The best Colonial mutton is more economical, weight for weight, than the best British. This fact was ascertained by an investigation made for the War Office by the writer with the assistance of the then President of the Society of Analysts, Dr. Bernard Dyer. The flesh of frozen mutton is damp and cold, and although the fat is white the lean is not so well coloured as home-killed mutton, while the kidneys are removed.

Bacon.—Where the quality and price of British bacon is satisfactory, it should always be preferred to bacon cured abroad. This is only a natural course to pursue. The war has developed the fact that we have been enriching the foreign producer to our own loss. Bacon for frying is one of the most costly of foods—a large proportion of the fat being melted as dripping which, at the moment of writing, is thus costing 1s. to 1s. 4d. per pound. A side of prime, sizeable bacon weighs from 56 to 65 lb., and is cut up by the tradesman in various ways. Let us take a side of 60 lb. as an example, and cut it in four parts. The fore end is cut right across to a little less than one-fourth of the length of the side. The other, or gammon, end including

the corner, is cut about the same length, thus leaving slightly more than one-half of the side. This is cut into two parts—the top being the long back, best suited for boiling, while the bottom forms the long streaky, chiefly the belly, for rashers. The fore end will weigh about 16 lb., the gammon end 14 lb., the back 17 lb., and the streaky 13 lb. These four parts of a side of bacon can be subdivided thus: the fore end is cut up into the collar or top corner, the piece next to it, which is the prime part of the collar, and a smaller cut which forms the thick of the back. Below the last cut comes a similar cut which forms the thick of the streaky. The gammon end is cut across the centre into the gammon and the corner piece above it, known as the corner of the gammon. The remainder of the long back is divided into the prime cut of the back ribs and the loin, while the remainder of the long streaky, cut into three, provides the prime thick streaky, the middle piece or thin streaky, and the hind piece or flank.

The best cuts of bacon are the back, streaky, and gammon; but the demand for these parts of the side is so general and constant that the tradesman is able to sell them at relatively more than they are worth. Thus it is that the fore-end and the corner piece of the gammon cost less, but in spite of the waste which they entail they are relatively

cheaper to buy. It is important to notice, too, that as the cheaper cuts of bacon are suited only for boiling they provide much more economical joints than those parts of the side which are cut up for rashers. The reason is, that while the rasher is accompanied by great waste, there is no waste in boiling, for no fat is lost.

In buying bacon it is the most economical plan to select small, fat meat—never lean meat—whatever the size of the joint. Lean meat means a larger proportion of bone, and a higher price for every ounce upon it. The fatter the meat, therefore, the lower the relative cost, and what is much to the point, the lower the actual cost by the pound, for the public object to fat meat, and its price is lower in consequence. The fore-end may be most uneconomical when it is lean, for the same reason, while it may be most economical if it is fat. It is necessary, too, to point out that the objection to fat is perfectly groundless—its value as *food* is much greater than that of the lean, which not only possesses small nourishing value, but is less wholesome.

Cheese is one of the most difficult foods for a non-expert to buy. Although there is no tangible loss of nourishing value as between British and imported cheese, there is a wide difference in its quality as denoted by its flavour and creamy con-

sistence. Colonial and American cheese possesses practically the same food value as English, but they are inferior in the points we have named. The natural colour of cheese is a pale straw, yellow cheese being artificially coloured. Cheshire cheese is usually yellow. Prime Cheddar is no better as food than the other varieties of firm or pressed cheese, but the early ripening Cheshire, containing more water, is of less nourishing value. The buyer of cheese should ascertain that it is agreeable in flavour, see to the weight, and reject a cut which is mouldy or cracked.

Dutch cheese, whether the round Edam or the flat Gouda, like the French and Swiss Gruyère, is made of pure cows' milk, and possesses a similar food value to that of English varieties. The Dutch makes are popular with the working-classes on account of their cheapness, while Gruyère, like the French Roquefort and the Italian Gorgonzola, are regarded as high class, and thus, realising a much higher price, are consumed by the wealthier classes. Roquefort and Gorgonzola, however, like our English Stilton and Wensleydale, are less nourishing and economical on account of the presence of the blue mould which makes them notorious, and which is nothing less than the common *Pencillium glaucum*, or blue fungus, which grows on stale bread and which causes it to be rejected as food.

Blue-moulded cheese, although constantly eaten, is not free from risk to persons of delicate health or weak digestion. The housewife with care for her family will act wisely to select cheese of other varieties.

Cream cheese should be selected while perfectly fresh or first commencing to develop its flavour. When fully developed it rapidly changes and is often spoiled before it is eaten. Curd cheese, which is made from milk without any addition of cream, is a useful and nourishing food at normal prices.

The French Brie, Camembert and Coulommiers, are all made from cows' milk, and are appetising but costly as food, and the remark equally applies to the Port du Salut, which is a slightly pressed variety.

Eggs.—It is not a little curious that the great majority of buyers, while insisting upon being supplied with new-laid eggs, know perfectly well that they are almost unobtainable during a great portion of the winter season. Although eggs are sold as new-laid, retailers have not hesitated to tell me that those they were selling, although imported, were sufficiently fresh to warrant the description. If an egg is sweet, whether it is imported or preserved in water glass, it is quite as appetising and nourishing as one which is only twenty-four hours

old, however much people may persuade themselves to the contrary. An average egg should weigh 2 oz.; it should be clean, the shell as bright as though it were polished, and the air chamber at the large end undiscernible. A stale egg has lost a portion of its moisture, and the space thus diminished by its tangible contents is occupied by air. A preserved egg has lost its polished appearance, and its money value is reduced accordingly. The buyer should always remember that eggs are examined very carefully by salesmen before they are graded and priced, and that the poorest, whatever their appearance, are sold at lower prices. Eggs may frequently be purchased at low prices in Ireland, Wales, Cornwall and other parts of the country distant from large markets, but a sample lot should be obtained before giving a regular order, and this should be the basis of future supplies.

FARINACEOUS FOODS

Rice, which is the most popular of all the cereals used in the preparation of dishes for the table, demands close attention at the hands of the buyer. The retailer offers his customers several qualities—the more expensive samples being bolder and whiter. If rice is clean, however, the cheaper samples are equally as good, as food, as the more costly; and careful comparison of both cooked and

uncooked rice will confirm this opinion. Rice in the husk, which is known as paddy, is of greater nourishing value than polished rice, but it is next to impossible to induce the average buyer to believe it. Rice is not adulterated, although its flour is sometimes used to adulterate other foods. Old rice is of greater value than new, and ground rice should be white, clean and easily thickened in cooking.

Tapioca.—This food is not only adulterated but imitated—the spurious product being obtained from potato-starch, which is neither so nourishing nor so agreeable a food. Imitation tapioca is improperly described, and it is surprising that the description is permitted. It can be recognised by its whiteness, its comparative brittleness, and its larger size, while it dissolves more quickly in water. The buyer should take care not to pay for it at the price of the genuine article, which is not commonly sold at those shops which are frequented by the working-classes.

Sago is similarly imitated by productions from potato-starch. Instead of tiny grains, or grains of the size of pearl-barley, all of which are hard, tough, almost transparent, and without any smell in the real sago, the imitation is ringed, and distinguished by a sensible odour when covered with boiling water.

Preparations of *Maize* such as *Cornflour* and *Post Toasties*, *Wheat* as in *Force*, *Oats* as in *Quaker* and *Rolled Oats*, *Pearl Barley*, *Macaroni*, *Spaghetti*, *Vermicelli*, *Dried Peas and Beans*, are more or less sold in packet form, and need no particular examination. The question of price, however, is worthy of remark. We have noticed that the charge for a given article is usually lower in the poorer districts of a town and especially in London, and it will pay the buyer living contiguous to such a district to buy it. The remark applies also to rice, tapioca, and all farinaceous foods, some of which, however, demand examination and comparison. Where these foods are used in considerable quantities, large parcels should be purchased at one time, as a saving is effected. This is shown by comparing the cost of a number of small lots with the cost of the same weight purchased in bulk.

Jam and *Marmalade* are other examples of the importance of buying a large lot at once. The grocer's quotation reduces the cost by the pound, when a large jar is taken instead of a small pot. If I may take Messrs. Pink as an example, for I have seen their process of manufacture on a large scale, I believe that these foods are of exceptional purity.

Sugar presents one difficulty in the way of economy. The average housekeeper exhibits an

unwarrantable preference for white lump, or white granulated, which costs more money to buy, without supplying a corresponding advantage. I frequently notice the wry face of the young, like the indisposition of those whose age should endow them with more common sense, who decline to eat brown sugar, however good it may be. As food, one variety is practically as good as the other, and while brown sugar possesses a flavour of its own, its sweetness and nutritive value makes it quite as useful as the white, and where cost is an item to be considered it ought to be used. In a home where so much depends upon a small weekly wage, or on an otherwise limited income, a family has no moral right to waste money on prejudice. The fault lies in the selfishness and extravagance of the age, and the well-to-do are the principal culprits. They will have what they like, and so young people are trained, for they naturally copy their elders.

VEGETABLES

Young vegetables are the best. The *Potato* varies considerably in quality and nourishing value. The best plan is to buy by the bag direct from a farmer who is able to recommend a good floury and economical variety. The potato grower submits samples to the salesman, through whom he sells his crop, and these samples are boiled in their

jackets for close examination and comparison before they are priced. The wise housewife will adopt a similar course, and thus provide a sound economical food. Coarse thick skins, deep eyes and disease, all mean waste. The potato should be purchased by weight—a bag holding two bushels of 56 lb. each. Purchased by measure the buyer never knows how many potatoes he gets as the measure cannot be properly filled, whereas its weight depends upon the size of the tubers. A sample of one variety of potato is not a guide to the quality of another sample of the same variety, for much depends upon the soil upon which it is grown and the system of manuring. Large potatoes should be preferred to small ones—the waste in peeling being greater in the latter.

Turnips, Carrots, Parsnips, and Kohlrabi should be young and, therefore, comparatively small, but they present nothing to waste. When buying in the winter, however, from lots that have been stored, the roots are longer and coarser, and there is plenty of waste. The buyer should look for smooth, fine, thin-skinned vegetables, which are sound and are cleaned. The *Swede Turnip* is richer as food than the white or yellow varieties, and is cheaper to buy, especially if it can be obtained from a farmer. *Beet* is worth more money than the roots just referred to, owing to its richness in sugar.

In purchasing vegetables it is important that the buyer should get all the food that he can for his money. Thus *Leeks* should have large white heads and small tops, rather than small heads and abundance of tops. *Cabbage* should not be too large and too coarse. With many outside leaves and little heart there is both waste and absence of nourishment. The heart should be large, white and tender, and not large and coarse as in the cow cabbage. Discoloured *Cauliflower* or *Broccoli* should be rejected, while *Brussels Sprouts* should be large, crisp, fresh, green and tender. *Spinach* should be clean and free from sand; *Lettuce* of medium size and filled with a large white heart; *Tomatoes* sound, free from wrinkles, and with as few pips as possible—the imported varieties being coarse, of inferior flavour, thick skinned and wasteful.

Large *Rhubarb* is cheaper than the small, and much more economical, but it is of inferior flavour. In buying *Peas* care must be taken by the unwary, as the common field peas form a large proportion of the summer crop, and these are sold at more than their value. The buyer must see that peas are young, large and tender, for without the requisite care she may be supplied fives times out of six with old peas of inferior quality. *Runners* and *French Beans* should also be young—old beans

being stringy and wasteful, cooking badly. In selecting either variety care should be taken to reject beans which are dry, limp, or not fresh and bright green in colour.

FRUIT

There is no greater scope for economy than in the purchase of fruit, where it is largely consumed, and it should be eaten all the year round. As a rule, and with the possible exception of the banana and the orange, fruit is expensive in winter. By forethought and care, however, in the early purchase of apples, the most valuable of all fruits for maintaining good health, a supply may be obtained for the whole winter at very small cost. Owners of orchards in this country are always anxious to sell, and are willing to accept a very moderate price where a quantity is sold at one time. By timely inquiry, or by replies to advertisements, which are always more or less numerous, a grower is located with a business result. A sufficient quantity of a few long-keeping apples, should be secured to last until April or May. Among the best of these are, for dessert, Scarlet Nonpareil, which is ready for eating from December to January, Blenheim Orange, King of the Pippins, and Cox's Orange Pippin—all of which I have found keep well until

March—Sturmer Pippin and Everlasting, which keep until May. For early eating—July until November—some of the best varieties are Devon Quarrenden, Beauty of Bath, Worcester Pearmain, Gravenstein and Ribston Pippin. Among the best keeping cooking apples are Prince Albert, Lord Derby, Hawthornden, Golden Noble, Bismarck, Bramley's Seedling, Beauty of Kent, and Dumelow's Seedling—the last five of which will keep until March and April. A study of the best method of keeping must be made. When it is possible to buy at a penny to twopence a pound, it is obviously economical to do so, when the apples are picked, instead of paying fourpence to sixpence in winter. One qualification, however, must above all things be observed—there must be no bruised fruit, all must be hand-picked, or losses are certain to follow. Apples should be as large as possible. The waste in small fruit may equal one-half its weight, whereas in large fruit it should not exceed one-eighth. Thus a bushel of quite small apples weighing 46 lb. would be reduced to 23 lb., whereas a bushel of large fruit weighing the same number of pounds would be reduced to 36 to 38 lb. At 2s. a bushel the small fruit would cost 4s. a bushel net, while at 4s. a bushel the large fruit would cost only 4s. 6d. and be in every way better.

Pears are almost proverbially believed to be

non-keepers. As I write, in the middle of March, I have a small pear ripe, and a large variety, both unnamed, which will not be ready for a month. The pear buyer who can obtain full supplies until Christmas at moderate prices should make a point of obtaining all that he requires of the late keeping varieties, and these include Bergamotte Esperen, Olivier de Serres and Easter Beurrè, for dessert, and Catillac, Verulam and Uvedale's St. Germain for stewing. All these varieties will keep until March or April. It is not desirable to buy quantities of early pears, so many of which ripen so rapidly that there is at all times possible loss.

Pears, like all fruits, may be purchased from Covent Garden and other market salesmen, by the basket or sieve, but the practice needs considerable care. Although prices are very much lower than those of the retailer, my own experience is so varied that I cannot recommend it, for the following reasons: there is either short weight or short measure, and sometimes spoiled fruit, and this may be considerable in proportion to the whole. The fruit selected is sometimes not the fruit which is sent. There is delay in expedition and possible overcharge in the freight. Baskets must be paid for on the basis of a return of the money on receipt of the empties, which are frequently long delayed, or perhaps not returned at all.

Soft fruit is much the most unsatisfactory to buy from a market salesman. Before payment for selected lots the fruit should be examined to the bottom of the basket and the basket marked or taken away at once. The buyer of soft fruit should reject any sample that is damaged, discoloured, or decomposing, for it is a danger to health. The seller of abnormally cheap fruit should always be watched; like the costermonger, he is liable to take advantage of the unwary by giving short weight or spoiled fruit. Traders in the best streets who supply the wealthy consumer, to whom money is no object, are better avoided by people with shallow purses. They pay higher rents, rates and taxes, which they are obliged to obtain from their customers for goods which are no better than those which are supplied by more modest competitors.

The *Orange* is not worth the attention of the housekeeper until it is sweet. Jamaicas, which are the first to arrive, are usually too acid for food. Ripe oranges bought by the case of 250 to 400 are very much cheaper than those bought of the retailer, but, as mentioned already, no purchase should be completed until the buyer is certain that they are all sound. I have known a case which was paid for to contain on arrival 200 bad fruits.

The *Banana* is one of the fruits about which

the public can make little mistake, whether purchased from the barrow of the coster or of a fruit dealer. When the market is over-supplied the banana may sometimes be purchased at three for a penny; a stock of fruit not over-ripe should then be laid in. Although the small Canary banana possesses the better flavour of the two varieties known in this country, there is no reason to believe that it is more nourishing than the large banana which provides more food for the money.

As *Nuts* are costly as foods, owing to the great weight of the shell, care must be observed in purchasing samples which are so frequently bad. The walnut is better bought from the "merchant" in the street, who, without a character to recommend him, provides the only assurance of fair treatment in his power, by cracking his nuts. I have found by experience that this nut is most unsatisfactory. for when a large number are bad the cost at 8*d.* a pound may, and sometimes does, mean that the actual kernel costs 2*s.* 6*d.* a pound. The abnormally large walnut is better avoided; it is either too costly or a large proportion is worthless. Brazils have risen in price and should not cost more than 6*d.* a pound. They are much safer to buy when they are new—an old sample containing a large proportion of bad nuts. Chestnuts are much the cheapest and most satisfactory of all nuts. If two

or three when opened are sound, they may be purchased with safety; but they should not cost more in normal times than 3*d.* a pound. Hazel, Spanish and Almond Nuts are all too expensive as food, judged by their cost and the weight of their kernels.

CHAPTER XII

FITNESS FOR WORK

IT is important to every man to be "fit" for his work. Fitness, however, does not solely depend upon food. All that ensures health ensures energy. Energy is expended by the heart in its never-ceasing labours, in the expansion and contraction of the lungs in the process of breathing, and in the movement of every muscle in the body; and no man can be fit unless his whole system works as exactly as the clock.

To keep fit it is essential to breathe pure air, to observe cleanliness, which so many ignore, exercise, environment, and care in eating. The man who sleeps with closed windows should learn that air is of much greater primary importance than food.

Under normal conditions we breathe nearly 25,000 times in twenty-four hours, and the air we exhale contains a dangerous gas, known as carbonic acid, which does much harm to the system, where it poisons the air.

In an unventilated bedroom the air contains four times as much of this gas as the air in the

street, but if we may judge by what we see every morning in walking before most people are up, the bedroom windows of nine houses out of every ten are closed during most part of the year, and the pure air which is more important than food is excluded in favour of the poisonous mixture. If there was no ventilation whatever a man could not stay in his bedroom more than a few hours without losing his life.

Pure air, too, is essential to the digestion, and therefore to fitness, and the more a man passes through his lungs under normal conditions, the more he gets out of his food. It is partly for this reason that he should take regular exercise.

If a man breathes fifteen times a minute when he is writing at his desk, and thus uses 480 cubic inches of air, he only employs about one-fifth as much as if he were walking at the rate of four miles an hour. If he increases his speed he also increases his breathing, and takes in more air, just as when he decreases his speed he inhales less.

Thus, when walking very slowly the air inspired is double as much as when resting or sitting at work, and so it is that a man taking his exercise, by increasing the oxygen taken into his lungs, gets rid of the poisonous waste, and his system is cleaner in consequence.

In maintaining fitness a man should walk four miles at a stretch at a good pace at least once every day. It improves his circulation, every muscle and vital organ is helped, while the functions of the liver and stomach receive an impulse for good by every contraction and expansion of the lungs.

It is stated on authority that when our soldiers are on a quick march they step 116 times in a minute. I find that in walking at a similar pace I take 120 steps, but I am taller than the average man. A man should make his own pace, too, or he may lose power, just as the short soldier, with a naturally smaller stride, loses power when he is marching with taller men, because he is obliged to keep step with them.

It is an accepted rule that the power expended by the muscular system of a man weighing 150 lb., and doing an average amount of work daily, is equal to lifting 300 tons one foot off the ground; but the soldier with his kit on his back, which adds 50 per cent. to his labour, does much more than this on a long march, in addition to his expenditure of energy in other directions.

An hour's quick walking before breakfast makes a healthy man fit for the day, but he must not make the mistake of supposing that he can split up this time into two periods, for it is not the

same thing. Slow walkers should gradually accustom themselves to a faster pace and longer distances, for fitness is not gained by a stroll. This needs mental as well as physical training until the habit is formed, when the healthy man at sixty or seventy may become as fit as if he were twenty years younger.

We Englishmen thrive on our morning tub of cold water, not because it is good for us, but in spite of it. A cold bath on rising from bed is taken when the system has the least power of resistance, and, however well the robust are able to stand it, it is not the best time. Eleven or 3.30 is very much better, but neither is convenient to the average man. Daily sponging with cold water at 60° F. and a weekly warm bath will remove the secretions, and maintain a clean skin.

It is important, too, *where* we labour. A ploughman has a much better chance of maintaining fitness and living a long life than a man who is confined to an office, badly lit and badly ventilated. Next to pure air he requires sunlight, but a man in a sedentary occupation can overcome these personal troubles if he chooses to keep in perpetual training—working, eating, sleeping, walking—to *live*, instead of living for perpetual pleasure. I hold, too, that *faith in the great future life* is an essential to that form of perfection in manhood

to which all healthy men should aspire. There is no satisfaction in living without that.

No man can become fit for his place as a worker if he eats like a pig. We all eat too much, and most of us eat the wrong foods. Our belief in our insular safety is a continual incitement to indulge in luxurious living. While it is quite the right thing to live as economically as we can, that we may the better help our country and ourselves should a rainy day arrive, it is equally true that we should be much the better for it. Less poultry, less meat, and less fish—or, still better, neither one nor the other for middle-aged people at least—less milk and cream, except for the children, and more cereals, nuts, vegetables, and fruit, if more of the first-named are needed. No alcohol, less coffee, no afternoon tea—it is waste—for all these are luxuries, and detrimental at that. Drink is much the most useful in fruit.

CHAPTER XIII

SLEEP

I HAVE observed that there are two opinions among medical men with regard to the importance of time in our sleep. It was my misfortune to sleep very badly for years, whether with the assistance of drugs or without. If long experience confers the knowledge of the expert in insomnia, then I am an expert on Sleep; and yet how little we know or can learn from ourselves or the highest authorities on the human machine. One of the ablest medical writers on the art of the management of life has remarked that "much sleep is not essential for any one," and this expression of belief has been emphasised by other members of the profession, as well as by men who have lived to great ages. On the other hand, there are still stronger expressions of opinion by men of both classes, some of whom attribute health and long life to consistent and long hours of refreshing sleep. My own belief is, that much depends upon the temperament. A man of calm, happy dis-

position may lie awake consistently and contentedly, enjoying four to five hours only, without harm to his constitution, his temper, or his nerves. Where, however, there is mental tension or a highly strung, nervous temperament, short hours of sleep are not only accompanied by unhappiness and the expenditure of nervous energy, but are followed by some exhaustion and consequent unfitness for mental and physical work.

The abnormal activity of the brain which frequently follows late tea or coffee drinking, owing to the stimulation of the central nervous system by the drug, caffeine, which these beverages contain, at once deprives the individual of the power to sleep and diminishes the energy at his disposal for the work of the following day.

Sleep imparts strength, both to the fatigued body and the tired brain, and is more abundant with the physical than the mental worker. It is a healer in sickness, a reviver in health, reimparting the vigour which has been diminished by the work and thought of the day. When sleep fails him for long a man is in a bad way. That every one knows, for every one sees it. It is written in the expression in the eyes, in the appetite, and in every action of the limbs.

Failure to sleep, or insomnia, may result from one of various causes—

Drinking tea or coffee late at night, or drinking either to excess.

The habit of thinking out the problems of science or business in bed.

Anxiety in relation to health, finance, the worries of business, sickness, the loss of beloved friends, failure to achieve some success on which the heart is bent, scandal.

Pain, indigestion, disease.

Constructive work after the last meal of the day.

When sleeplessness becomes habitual it is apt to get pronounced, and to develop into insomnia. Some men accept it with more or less complacency, light their lamp and read, or rise from bed, make a cup of tea and smoke a cigarette. I have met with some sufferers from sleeplessness who make a practice of going for a walk in their respective towns, or in their gardens, in the small hours of the morning, but seldom with effect. Effort rather repels than rallies sleep.

The last resort with the normal man is too often the first resort of the nervous and fearful—he takes to drugs, which he should only be able to obtain from a qualified physician. The almost promiscuous sale of hypnotics by druggists is a premium upon death, which takes an annual toll

of hundreds of our people. I warn the sleepless against all these artificial remedies for sleeplessness, by whatever name they are called, and however harmless they may be described.

Experience has completely demonstrated the helplessness of science in the provision of sleep, and especially of natural sleep. The unconsciousness which is closely allied to it, but which is governed by drugs, is not the same thing, if we may judge by the after results. Nor can the sleepless always depend upon the action of drugs. It is for this reason that the dose is increased, or that two forms of hypnotic are taken at one and the same time. Sometimes, too, a short heavy sleep is concluded by a sudden awaking with distress so appalling that another dose is taken—and so the habit becomes unthinkably dangerous.

The man who suffers from sleeplessness must make up his mind to be brave; he will need plenty of courage in his effort to conquer it. Yet he will conquer it if he makes up his mind to be resolute, and regard his determination as something more than a forlorn hope. There is no royal road to victory over insomnia. The cause—and there is always a cause—must be removed. This step must be regarded as imperative, however much it may cost, and it is here that immediate and

constant courage is needed. It must, too, mean early to bed and early to rise. If sleep appears to be hopeless, it must be remembered that as it was long in departing it may be long in returning. While the body is resting, the mind should rest too—not expending the energy in thought and anxiety which the body is needing. Though hours may pass without sleep night after night, patience will win in the end.

When the brain is actively thinking and concocting, and the whole man apprehensively trying to check it, it had better have rein, if everything fails. This often quiets the fears, until nature takes the matter in hand, and some sleep is obtained. Sufferers from insomnia frequently get short snatches of sleep without being aware of the fact, and they are apt to deny it. A watch placed within a glance of the eye will quickly convict the most devout disbeliever on this point, if he will test himself boldly. There should be no smoking, no reading, in bed. Sleep cannot be cajoled until habits which have scared her away have been abandoned, whatever the remedies applied.

Among the numerous aids to sleep are the hop pillow, which acts quite the reverse until one gets accustomed to its presence, and then it has lost any influence which it ever possessed. Hot milk; milk and egg; milk, egg, and brandy; a light meal; a long walk, a rapid drive, hot water up to the

knees, a body compress, massage, a hot bottle to the feet—all have their advocates, but all fail in pronounced cases. A smart walk of a couple of miles after dinner or supper is an excellent plan as an assistant to health, with a glass of hot milk on the return, if a sufficient time has elapsed since leaving the table. Whatever conduces to re-establish the health will assist in the re-establishment of sleep. A wholemeal biscuit and butter, or gingerbread, in the night is often found useful to incite sleep, but this, too, is apt to fail if it is taken in a regular way, and it is not wise to make it a practice.

Insomnia should be treated calmly, for it means nothing to the man that is sound. It is an illusion to think that, unless much pronounced, it does any serious harm. We must think of what others are suffering—the wounded, the sick, and the dying, no hope in this life, and sometimes, alas! no hope in the next. Yet with all our mental suffering hope still remains—it is eternal in the human breast. Excitement and fear must give way to thankfulness and rest. If we *must* lie and think, we can construct plans for our daily life, its duties, its responsibilities, its usefulness, remembering that we are all here for a purpose. We must resolve to eat, to work, and to act in order to live, to take regular and sensible exercise, on foot or on horseback, and keep as fit as we can, always doing one mile, and

if possible two, before breakfast in all weathers and at all times.

What is the remedy for sleeplessness? A natural, simple, and objective method of living, with a clean body, open windows at night, and a low pillow. To exist for pleasure, for luxury, or for business prosperity never yet made a good man—still less a happy man. There is much that we can legitimately enjoy in life without making either of these ends the hub on which it works. Simple meals are among the first points to be observed, with abundance of fruit and salads, for both give assistance to sleep. I am not describing a theory, but sensible, definite practice, which has rebuilt broken lives, restored all that makes life worth living, and conferred as much on the intellect as it ever enjoyed.

Comfort in sleep may be better obtained by clothing the bed like the body, by the indications of the thermometer, which should hang in the bedroom. One blanket less or more makes a great difference in very changeable weather, for sleep is often broken by chilliness on the one hand, or by perspiration when there are too many wraps on the bed, on the other. Some people fall off to sleep while counting five hundred, or while reciting a poem. I suggest the silent recital of hymns which direct the thought to that one Source of Love Whose Name should be the last on our lips.

CHAPTER XIV

RECORDS OF WEIGHTS OF FOOD BEFORE AND AFTER COOKING

1. *Leg of Lamb.*

	lb.	oz.
Weight before baking	5	6
Weight after baking	3	13
Dripping saved on potatoes beneath.		

2. *Mutton Chop.*

	oz.
Weight barely	9 @ 1/6
<hr style="width: 10%; margin: 0 auto;"/>	
Weight after cooking	6
Weight, less bone and skin	4½

Cost of meat, including surplus fat and inedible tissue, 3/- lb.

3. *Shoulder of Mutton.*

	lb.	oz.
Weight	6	1 @ 1/1
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Weight after roasting	5	1
Bones		11
Dripping		4½

Net weight, including the dripping, 4 lb. 6 oz., increasing the actual cost of the meat to 1/6 lb.

4. *Pork (lean loin).*

	lb.	oz.	
Weight	4	12	@ 11d.
Weight after cooking	4	2	
Dripping		3	
Bones		5	

Cost of meat, 1/2 lb.

5. *Ribs of Beef.*

	lb.	oz.	
Weight	3	12	@ 1/2
Weight cooked	3	2	
Bones		14	
Net weight	2	4	

Cost of meat, 1/11 lb.

6. *Sirloin of Beef.*

	lb.	oz.	
Weight	4	0	@ 1/2
Weight after roasting	3	4	
Bones		12	
Net weight of edible meat	2	8	

Cost of meat, 1/10 lb.

7. *Boiled Beef.*

	lb.	oz.	
Weight	4	1	@ 1/1
Weight cooked	2	8	
Bones		4	
Net weight of meat	2	4	

Cost of edible meat, 1/11½ lb.

8. *Fat Brisket of Beef.*

	lb.	oz.
Weight	6	0
Weight after baking	4	8
Bone		12
Dripping		4
Net weight of meat, with dripping	3	12

Cost of edible meat. $1\frac{1}{7}$ lb.

9. *English Shoulder of Mutton.*

	lb.	oz.
Weight	6	15
Weight after cooking	5	4
Bones and waste	1	0

Edible meat cost, $1\frac{1}{8}$ lb.

10. *Turkey.*

	lb.	
Weight with insides	10	@ $1\frac{1}{3}$
Ready for cooking	7	
Cooked	6	
Bones and waste	3	

Edible meat cost, $2\frac{1}{1}$ lb.

11. *Plaice.*

	oz.	
Weight	18	@ 1/- lb.
Weight cleaned	17	
Weight after cooking	14	
Bones and waste	$4\frac{1}{2}$	
Edible meat	$9\frac{1}{2}$	

Cost, $1\frac{1}{8}$ lb.

12. *Rice Pudding.*

	oz.
Rice	5
New milk, 3 pints	60
Little butter and sugar	
Weight of cooked pudding	54

11 oz. each for 5 persons. Cost, $1\frac{1}{2}d.$ each.

13. *Ribs of Beef (fat).*

	lb.	oz.	
Weight	7	13	Cost, 8/6
Weight after cooking	6	10	
Bone	1	8	
	5	2	

Cost, $1/8$ lb.

14. *Beef.*

	lb.	oz.
Weight	49	4
Weight after cooking	38	8
Bone, gristle, and dripping	10	0
	28	8

Price not supplied. If $1/-$ lb., the cost of the edible meat would be $1/9$ lb.

15. *Beef.*

	lb.	oz.
Weight	43	8
Weight after cooking	36	4
Bones, waste, and dripping	10	0
	26	4

At $1/-$ lb. this meat would cost $1/8$ lb.

16. *Ribs of Beef.*

	lb.	oz.	
Weight	11	10	@ 1/1 = 12/7
Weight after cooking	6	9	
Bones and waste	3	10	
	2	15	

Cost, 4/2 lb.

17. *Beef (topside).*

	lb.	oz.	
Weight	5	9	@ 1/2 = 6/6
Weight after cooking	4	9	
No bone			

Cost, 1/5 lb.

18. *Wing Rib of Beef.*

	lb.	oz.	
Weight	7	1	@ 1/2 = 8/3
Weight after cooking	5	4	
Dripping 4 oz., bones 12 oz.	1	0	
	4	4	

Cost of edible meat, 1/11 lb.

19. *Beef.*

	lb.	oz.	
Weight	6	0	@ 1/- = 6/-
Weight after cooking	4	8	
Dripping 8 oz., bones 14 oz.	1	6	
	3	2	

Cost of meat, 1/11 lb.

20. *Mutton (joint unknown).*

	lb.	oz.	
Weight	9	0	@ 1/-
<hr style="width: 10%; margin-left: auto;"/>			
Weight after cooking	7	0	
Bone and waste	1	3	
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	5	13	

Cost of meat, $1/7$ lb.

21. *Loin of Mutton.*

	lb.	oz.	
Weight	6	4	@ $1/2 = 7/3\frac{1}{2}$
<hr style="width: 10%; margin-left: auto;"/>			
Weight after cooking	4	$9\frac{1}{4}$	
Bones		$11\frac{3}{4}$	
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	3	$13\frac{1}{2}$	

Dripping $1\frac{1}{4}$ oz.

Cost of meat, $1/11$ lb.

22. *Two Legs of Colonial Mutton.*

	lb.	oz.	
Weight—each	4	6	@ 1/- = $4/4\frac{1}{2}$
<hr style="width: 10%; margin-left: auto;"/>			
After cooking—each	3	8	each
Dripping 3 oz. bone			
10 oz.		13	
<hr style="width: 10%; margin-left: auto;"/>			
	2	11	

Cost of edible meat, in each case, $1/7\frac{3}{4}$ lb.

23. *Bacon (boiled).*

	oz.	
Weight	12	Cost, $11\frac{1}{4}d.$
	<hr style="width: 50px; margin: 0 auto;"/>	
Weight after cooking	8	
Rind	$\frac{1}{2}$	
	<hr style="width: 50px; margin: 0 auto;"/>	
	$7\frac{1}{2}$	

Cost, $1/10\frac{1}{2}$ lb.

24. *Ham (steamed).*

	lb.	
Weight	14	Cost unknown.
	<hr style="width: 50px; margin: 0 auto;"/>	
Weight after cooking	13	
Shin-bone and fat wasted	3	
	<hr style="width: 50px; margin: 0 auto;"/>	
	10	

At $1/2$ lb., cost $1/7\frac{1}{2}$ lb.

25. *Portion of Ham.*

	lb.	oz.	
Weight	4	12	@ $1/6 = 7/1\frac{1}{2}$
	<hr style="width: 50px; margin: 0 auto;"/>		
Weight after cooking	3	$12\frac{1}{2}$	
Bones 10 oz., rind $5\frac{1}{2}$ oz.		$15\frac{1}{2}$	
		<hr style="width: 50px; margin: 0 auto;"/>	
	2	13	

Cost of meat, $2/6$ lb.

26. *Three Salmon.*

	lb.	oz.	
Weight	31	0	No price given.
	<hr/>		
Weight after cooking .	27	4	
Bones, head, and skin .	5	0	
	<hr/>		
	22	4	

At $1/8$ lb. the cost of the meat would be $2/4$ lb.

27. *Rock Salmon.*

	lb.	oz.	
Weight.	1	8	@ 8d. = 1/-
	<hr/>		
Weight after cooking .	1	5	
Skin and bone.	0	2	
	<hr/>		
.	1	3	

Cost, 10d. lb.

28. *Turkey (before dressing).*

	lb.	oz.
Weight	24	0
	<hr/>	
Weight dressed	19	0
Bone and skin	4	4
	<hr/>	
Net weight	14	12

29. *Guinea-chick (dressed).*

	lb.	oz.	Cost, 3/9
Weight	2	5	
<hr/>			
Cooked and stuffed . .	1	12½	
Stuffing		4	
<hr/>			
Bones	1	8½	
		7	
<hr/>			
Head, feet, and entrails .	1	1½	
		10	

Cost of meat, 3/5 lb.

30. *Rice.*

Weight	oz.
	5
Milk, 1 qt.	40
<hr/>	
	45
Weight baked	40

Cost, 6d. Sufficient for five people.

CHAPTER XV

FOOD VALUES IN RELATION TO PRICE

THE figures in this table are only approximate, for foods of all kinds vary both in composition and price. Prices, too, have in some instances been largely increased since the commencement of the war, and this fact has been taken into account. The figures relating to flesh and fish foods represent the edible portion only, while those relating to vegetables and fruits include edible skins, but not stones. The nutritive value of all vegetables and fruits is materially reduced by boiling. The foods are arranged in the order of their economical value—those which provide the largest quantity of nutritive matter for a penny taking the highest places. It is, however, important to remark that this matter is relative. Sugar and the fats and oils are food—but fuel foods only—inasmuch as they have no bone- or muscle-building value, containing neither protein nor mineral matter. They are, therefore, placed by themselves.

CEREALS AND PULSES

Providers of heat and energy, and muscle- and bone-builders

	Cost per lb. d.	Approximate No. of Units for a Penny.
Wheat	1½	1060
Maize-meal or Polenta	2	800
Rice in the husk	2	750
Rice (clean)	2½	640
Wholemeal Bread	2	625
White bread	2	625
Lentils	2½	640
Rolled Oats	3	580
Pearl Barley	3	520
Peas	3	520
Beans	3	520
Semolina	3½	450
Macaroni	4½	360

ANIMAL FOODS

Providers of heat and energy, and muscle- and bone-builders

	Cost per lb. d.	Approximate No. of Units for a Penny.
English Pressed Cheese	12	170
Separated Milk	1	150
New Milk, 1 pint = 1¼ lb.	2	125
Curd Cheese (ripened)	12	125
Eggs (8 to the lb.)	12	50

<i>Chiefly muscle-builders</i>	Cost per lb. <i>d.</i>	Approximate No. of Units for a Penny.
Fat Bacon	12	295
Sausage (good pork)	10	200
Fat Loin of Pork	12	104
Beefsteak with some fat	16	75
Beef, medium fatness	14	72
Chicken (slightly fat)	12	70
Mutton, medium fatness	14	72
Tripe	10	70
Sweetbread	18	46
Brains	10	36
Calves' Head	10	28
Fresh Herrings (3 to the lb.)	4½	88
Bloaters (4 to the lb.)	10	75
Mackerel (2 to the lb.)	10	40
Salmon	18	33
Plaice (waste 25 per cent.)	13	10

VEGETABLES

Providers of heat and energy, and health-givers.

If these foods are boiled or their edible skins removed, their value will be reduced.

	Cost per lb. <i>d.</i>	Approximate No. of Units for a Penny.
Potatoes	$\frac{3}{4}$	440
Parsnips	$\frac{3}{4}$	330
Beetroot	1	300
Onions	1	250
Turnips	$\frac{1}{2}$	250
Leeks	1	250

Preparedness

The Vital Factor—

not alone in affairs of the Nation, but with the health of every citizen.

One seldom knows when the common enemy, illness, in one form or another, is about to strike; and the best form of preparedness is to keep body and brain healthy.

Active brains and vigorous bodies are the result of right living—food plays a big part.

Grape=Nuts

FOOD

made of whole wheat and malted barley, supplies all the bone- and brain-building, nerve- and muscle-making elements of the grains, including the vital salts, phosphate of potash, etc., often lacking in the diet of many, but imperative for bounding good health.

Grape-Nuts is easily digested—comes ready to serve from the moisture- and dust-proof packet. With good milk or cream Grape-Nuts supplies complete nourishment.

A ration of Grape-Nuts each day is a safe play for health, and

“There’s a Reason”

Sold by Grocers everywhere.

The Way to Get Well

Will you kindly read this interesting letter?

"To THE WALLACE 'P.R.' FOODS CO., Ltd., Hornsey, London, N.

"Gentlemen, as I am forwarding you an order I will take the opportunity to thank you for the benefit I have derived from your 'P.R.' Biscuits. An explanation of my case will take too long to write, it is one of greatly impaired digestion, non-assimilation and mal-nutrition, and when I tell you that for the last six years I have been obliged to subsist principally upon Peptonised Milk (for the first twelve months I could only take Peptogenic Milk Baby's Food) you will understand mine is no ordinary case of indigestion.

"Having in vain tried many of the advertised 'easily digested nourishments,' I can assure you it was in a very sceptical frame of mind that I tried your 'P.R.' Biscuits, and was most astonished to find they did not upset me. Then I decided to persevere with them, and for about six months have taken no other solid food, with the gratifying result that my general health has greatly improved, have put on flesh, and feel I am at last being nourished instead of half-starved as formerly. In fact, the improvement altogether is little short of marvellous. The 'P.R.' Biscuits certainly deserve all you claim for them, and I hope other invalids like myself will try them."

Deal, Kent, December 8th, 1915.

There are some 40 varieties of the "P.R." Biscuits, as well as a number of other "P.R." Products of great excellence and high health-value. Their regular use is both delightful, genuinely economical,

and the Way to Keep Fit.

☞ *We will gladly send a small box of Samples, with full details, post paid for 9d., or, better still—for it enables a fuller test to be made—we can send our Special Trial Parcel for 5s. carriage paid in U.K.*

The Wallace "P.R." Foods Co., Ltd.,
126 Tottenham Lane, Hornsey, London, N.



In cases of Dyspepsia the "P.R." Malt Biscuits, which are made from materials of superlative quality and purity, are invaluable. Send two stamps for Sample.

	Cost per lb. d.	Approximate No. of Units for a Penny.
Carrots	1	200
Celery	1	200
Salsify	2	170
Cabbage (white hearts)	1	150
Artichokes	1	150
Brussels Sprouts	2	100
Green Peas (without shells)	3	100
French Beans	2	90
Cauliflower	2	75
Spinach	2	50
Lettuce	3	25
Asparagus	18	6

NUTS

Chestnuts (new)	3	500
Hazel, Spanish, or Filbert Nuts (old)	16	190
Walnuts (new kernels)	16	125

DRIED FRUITS

Providers of heat and energy

	Cost per lb. d.	Approximate No. of Units for a Penny.
Currants	5	300
Figs	6	250
Dates	4	250
Raisins	6	250
Prunes	6	265
Apples	8	150

FRESH FRUITS

Health-givers

	Cost per lb. <i>d.</i>	Approximate No. of Units for a Penny.
Bananas (7 to the lb.)	4	62
Plums	4	62
Cherries	4	62
Oranges, edible parts (5 to lb.)	3	58
Apples	4	50
Pears	4	50
Currants	4	50
Gooseberries	4	50
Water Melons	6	33
Tomatoes	4	30
Whortleberries (Bilberries)	4	27
Strawberries	6	25
Raspberries	6	25
Apricots	12	18
Pincapple	18	14

Sugar	4	450
Butter	16	185
Margarine	8	370
Lard	10	400
Dripping	8	500

The **Food** which maintains physical fitness
better than any other is

WINTER'S

"Marked Malty Flavour"
The Lancet

BREAD

No other Bread provides you with the essential elements for maintaining vigorous health in such a complete form, and the weakest digestion can assimilate it with ease.

Winter's Bread has a delicious flavour, and the Fruit variety is a delicacy which appeals to young and old alike.

The **Medical Profession** and thousands of users have unhesitatingly proclaimed it The Premier Bread.

4d., 6d., 1s., and 1s. 6d. per loaf.

The 6d., 1s. and 1s. 6d. sizes are the most economical to buy, and if you desire the greatest amount of food value for every penny you spend, then you must purchase Winter's Bread.

Sold by all the leading Bakers, Confectioners, Grocers, and Stores.

Name of nearest Agent sent on request to the

SOLE PROPRIETORS AND MANUFACTURERS—

R. WINTER, Ltd., Birmingham.

The finest and most complete of all Foods is

FRESH MILK

absolutely pure and free from all forms of Preservative, as guaranteed and supplied by the

EXPRESS DAIRY CO. LTD.

HEAD OFFICE—

26/30 TAVISTOCK PLACE,
LONDON, W.C.

with Branches in all parts of the Metropolis and suburbs.

THE MARVELLOUS FOOD VALUE OF NUTS

is found in the most digestible form in Mapleton's Nut Foods, which are far more wholesome, nourishing and economical than meat.

They include NUT SOUPS, NUT MEALS, NUT BUTTERS, etc., and are all food and no waste or water. They require little or no preparation, and save the housewife's time and trouble as well as her pocket.

YOU WILL BETTER EVERY MEAL
by the addition of a packet or two of
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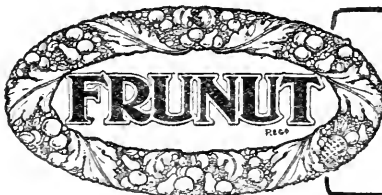
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